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UNIVERSITY OF ALBERTA

EDUCATION GRADUATE STUDENTS AS END USERS: A SURVEY OF USE OF COMPUTER-BASED BIBLIOGRAPHIC INFORMATION SYSTEMS AT THE UNIVERSITY OF ALBERTA

BY

FAYE MAXWELL

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF EDUCATION
IN
ADULT AND HIGHER EDUCATION

DEPARTMENT OF ADULT, CAREER AND TECHNOLOGY EDUCATION
EDMONTON, ALBERTA
(SPRING, 1991)

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Date: 19 April '91

ABSTRACT

This study examined the reported use patterns of computer-based bibliographic information systems by graduate students in the Faculty of Education at the University of Alberta. The systems included: an online catalogue, a database on CD-ROM (PsycLIT), a locally mounted database (ERIC on SPIRES) and a remote end user system (BRS After Dark).

The descriptive survey methodology was used to gather data. Questionnaires were sent to a sample of students, and the response rate was 60%.

Findings indicated that use rates varied with the system, and the students' departments and programs. Most students were regular online catalogue users, but the potential for increasing use of the other systems was considerable. Lack of previous computer experience was not related to non-use, but lack of previous library experience was related, when the systems were accessible only in the library.

Reasons for non-use included: use of other information sources, lack of need, lack of time to learn, forgetting how to search, anxiety about computers, anxiety about asking for help, and problems scheduling an appointment. For BRS After Dark, cost was a reason.

Students reported the use of six methods to learn to use the systems: workshop, library staff, computer screen, print instructions, an instructor, and a student. The most satisfactory methods were library staff and a workshop, while the least satisfactory were print and a computer screen. Most students who expressed a preference for an alternate method chose a workshop or library staff, but a group of independent learners preferred the computer screen or print. The time that most students wanted instruction offered was at the beginning of their programs.

Students' use of computer-based information systems could be increased by providing: more individual assistance, more classroom instruction, more help with using computers, more information on available systems, access to systems that are easier to use, and access to the literature in students' fields of speciality.

A number of recommendations were made relating to: acquiring new systems, marketing existing systems, changing the instructional program, and ensuring adequate access to the systems.

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monopolize the family computer. I promise I'll take a break.

- I would like to express my appreciation to the Department of Adult, Career and Technology Education for offering a flexible, individualized program, which is capable of accomodating the complex lives of their adult students, who often are trying to juggle career, family and education.

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Introduction to the Study

At the University of Alberta, graduate students in the Faculty of Education have access to a number of computer-based information systems. This study attempts to determine the rates at which the students are using selected information systems, and to identify ways of increasing their use. In order to place the study in context, some background information will be presented on the graduate students and the computer-based information systems under study.

Education Graduate Students at the University of Alberta

The University of Alberta houses 18 Faculties, with a student enrollment of close to 30,000 (University of Alberta, 1989b). Of these, about 11% are registered as graduate students. The two categories of graduate degree programs offered at the University of Alberta are doctoral and master's programs. Master's students may be registered in a thesis route or in a project route. Some post-graduate diplomas are offered, "which allow individuals to take a series of courses to increase their knowledge of a specialized area without needing to enroll in a degree program" (University of Alberta, 1989a).

In addition to being registered in one of several programs (doctoral program, master's program - thesis route, master's program - project route, or diploma program), education graduate students study in one of six departments: Adult, Career and Technology Education, Educational Administration, Elementary Education, Educational Foundations, Educational Psychology, or Secondary Education. Each of these departments focusses on a different aspect of Education.

The Department of Adult, Career and Technology Education offers programs leading to a master's degree in industrial arts, vocational education, instructional technology and adult and higher education. These programs are designed for professional educators and trainers, with successful career backgrounds in the profession of teaching (University of Alberta, 1989a).

The Department of Educational Administration offers doctoral and master's degrees, as well as post-graduate diplomas. The programs prepare students for a variety of administrative positions in schools, school systems, colleges, universities, and government, or as college and university teachers (University of Alberta, 1989a).

The Department of Elementary Education offers programs leading to master's and doctoral degrees, which are designed to help prepare consultants, supervisors, master teachers, and personnel for teacher education institutions (University of Alberta, 1989a).

The Department of Educational Foundations offers doctoral and master's programs in the following fields: the history of education, the philosophy of education, the sociology of education, comparative education, international education, anthropology and education, and intercultural education (University of Alberta, 1989a).

The Department of Educational Psychology offers programs leading to doctoral and master's degrees in the following specializations: educational psychology, counselling psychology, school psychology, and special education. These programs are designed to provide specialist training for teachers, administrators, consulting and research personnel, and others requiring special skills in this area (University of Alberta, 1989a).

The Department of Secondary Education offers programs leading to a master's or doctoral degree. The programs are designed to develop competencies as master teachers, educators in specific disciplines, curriculum and instruction specialists, and curriculum and instruction scholars (University of Alberta, 1989a).

Computer-based Information Systems at the University of Alberta

The main library used by Education graduate students at the University of Alberta is the H.T. Coutts (Education) Library, hereafter called the Education Library, which is part of a decentralized library system, consisting of five subject libraries, along with a number of smaller branch libraries and reading rooms.

The University of Alberta Library System, hereafter called the Library, introduced an online computer search service in the late nineteen seventies, which provided access to commercial database systems, such as DIALOG Information Services (DIALOG) and Bibliographic Retrieval Services (BRS). The databases were searched by intermediaries (librarians), and not by the end users (faculty and students).

The first online database search service usable directly by end users was introduced at the University of Alberta in 1986. The Library received a grant under a New Initiatives Program to provide an end user search service to graduate students. Free workshops were offered to graduate students on a sign-up basis. The workshop consisted of a lecture, followed by a hands-on lab, where students could conduct their searches. Starting in 1987 these workshops were offered in research courses in some of the Departments, and by 1989, all of the research courses offered in the Faculty of Education included an online searching workshop. In order to encourage the use of online search services, graduate students were offered a free search of up to an hour's duration following the workshop.

The first online catalogue was introduced at the University of Alberta in 1983 as a pilot project, and as the main catalogue in 1985. At the time of the study, the online catalogue had to be used for current materials, although the card catalogue had to be used for some pre-1974 materials.

A portion of the Education Resources Information Center (ERIC) database is stored on one of the University's mainframe computers, and is searchable through an interactive retrieval system - Stanford Public Information Retrieval System (SPIRES). Students can access ERIC on SPIRES from terminals or from microcomputers with a telecommunications link.

In 1988 the first compact disc - read only memory (CD-ROM) products were introduced at the University of Alberta. The Education Library acquired the CD-ROM version of The Psychological Abstracts (PsycLIT). Shortly after acquiring PsycLIT, the Education Library acquired another microcomputer, to enable students to search ERIC on SPIRES and to conduct searches on commercial end user systems. The availability of this equipment in the library provided Education Library staff with the opportunity to offer instruction and support for new users.

By 1989 Education graduate students had access to the following computer-based information systems in the Education Library: an online catalogue, two major education-related databases - ERIC and PsycLIT, and two free hours of searching on a commercial end user system - BRS After Dark (BRS-AD).

The Problem

The general problem addressed in this study is: what are the use patterns of computer-based information systems by graduate students in the Faculty of Education at the University of Alberta; how in their opinion can the use of computer-based information systems be increased?

Rationale for the Study

Computers have been introduced into libraries to improve access to information. It is important to know how extensively these computer-based information systems are being used by graduate students in order to formulate policy regarding training, marketing, acquisition of new systems, and maintenance of existing systems and services. This information on use is particularly important in a period of fiscal restraint.

The use of the computer-based information systems may vary among the six Departments within the Faculty of Education. Since students in the various Departments can be expected to need to use a different combination of information sources, the relevancy of the available databases can be expected to vary, and this will influence use patterns.

Students in different programs (Diploma, Master's - project route, Master's - thesis route, and PhD) may need different amounts of information, and therefore may have different use patterns, and different instructional preferences. Different instructional programs may need to be developed for students in different programs.

It is important to identify reasons for non-use so that steps can be taken to remove or to minimize some of the barriers. It also is important to determine what steps can be taken by the Library or by the Departments to increase the rates of use of computer-based information systems.

To help students learn to use the computer-based information systems, an eclectic combination of methods is being used by the Library: workshops, self-directed tutorials, printed "help sheets", on-line help and instruction screens, and one-on-one instruction. Some students learn to use computer-based information systems through trial-and-error, from another student, or from an instructor. It is important to know which methods students find satisfactory or unsatisfactory, so that the satisfactory methods can be continued, and the unsatisfactory methods can be improved or dropped. If student preferences for instruction are known, efforts can be made to provide the instruction that matches students' preferences.

The scheduling of instructional programs for students is another important question addressed in this study. If formal instruction is to be offered, it must be scheduled at a time that is appropriate for the greatest number of students. Otherwise, classes and workshops might be planned without attracting many students.

Students' previous computer and library experiences may affect the rates at which they use computer-based information systems. Students with little or no computer experience may be apprehensive, and may avoid using computer technology. Similarily, students who lack library experience, may avoid using the library, including its computer-based information systems. If this is so, different programs may be indicated for students who enter graduate programs with little library or computer experience.

The Sub-problems

The sub-problems relate to the general problem: What are the use patterns of computer-based information systems by graduate students in the Faculty of Education at the University of Alberta; how in their opinion can the use of computer-based information systems be increased?

Sub-problem One

What is the rate of use of BRS-AD following a compulsory workshop? What are the preferred methods of learning to use BRS-AD? Why have non-users not used BRS-AD?

Sub-problem Two

What is the rate of use of the online catalogue? How did users learn to use the online catalogue? Which of the methods used are rated satisfactory, and which methods are rated unsatisfactory? Which instructional methods are preferred by students? Why have non-users not learned to use the online catalogue?

Sub-problem Three

What is the rate of use of PsycLIT on CD-ROM? How did users learn to use PsycLIT? Which of the methods used are rated satisfactory, and which methods are rated unsatisfactory? Which instructional methods are preferred by students? Why have non-users not learned to use PsycLIT?

Sub-problem Four

What is the rate of use of ERIC on SPIRES? How did users learn to use it? Which of the methods used are rated satisfactory, and which methods are rated unsatisfactory? Which instructional methods are preferred by students? Why have non-users not learned to use ERIC on SPIRES?

Sub-problem Five

During what point in the graduate program would students find it most useful to learn to use computer-based information systems?

Sub-problem Six

In the opinion of graduate students, what could the Library or the individual Departments do to increase access to information through the use of computer-based information systems?

Sub-problem Seven

Does a lack of previous computer or library experience reduce the rate of use of computer-based information systems?

Definition of Terms

BRS-AD is a commercial database search service, which is marketed to end users during off-peak hours. It is searchable via terminals and microcomputers.

The online catalogue is the catalogue of materials held by the Library, which is searchable via terminals and microcomputers. Some materials acquired before 1974 are searchable by card catalogue only.

PsycLIT on CD-ROM is a compact disc version of The Psychological Abstracts, which is searchable by microcomputer.

ERIC on SPIRES is a sub-set of the ERIC database, which is available on one of the University of Alberta's mainframe computers, and is searchable via terminals and microcomputers.

A preference for instruction is a stated preference for one instructional method over another.

An instructional need is a gap between what is, and what should be in terms of results, and is amenable to treatment by instruction.

A perceived need is a need defined by what a person considers his or her needs to be.

An end user is a person who uses a computer-based information system, who will use the results of an information search.

An intermediary is someone who searches a computer-based information system for someone else.

Delimitations

The study was concerned with the quantitative use of computer-based information systems, and students' preferences for instruction. It did not attempt to assess how effectively graduate students use these systems. Because library staff usually work on a one-to-one basis with the graduate students, who are learning to use computer-based information systems, they are able to assess the effectiveness of student searches, and modify instructional materials on a regular basis according to the experiences of students. Even in the workshops, there is a low staff-to-student ratio so the effectiveness of student searching can be monitored.

The sample was restricted to graduate students in the Faculty of Education, who attended a BRS-AD workshop given by library staff within one year prior to data collection. Since all graduate students who register in a research course receive instruction on BRS-AD, this restriction ensured that the students participating in the study would have been exposed to at least one computer-based information system.

The sample was restricted to graduate students who were registered in the Winter, 1990 term. This restriction ensured that the population being studied would have had the opportunity to use all the systems and instructional methods under study.

Non-users of computer-based information systems may avoid using the systems because they are apprehensive about using technology. Some of these non-users are reluctant to admit their anxiety, and may express positive attitudes regarding the use of technology, even though they do not use it (Matthews, Lawrence & Ferguson, 1983). This potential discrepancy between what is said and what is done creates a problem in any study of technology use. When interpreting the study results, this limitation should be kept in mind.

Assumptions

The study assumed that the sample selected was representative of graduate students in the Faculty of Education at the time of the study.

The study assumed that students remembered how they learned to use computer-based information systems, that they were able to assess whether a particular learning method was satisfactory or not, and that they were able to articulate preferences for instruction.

The study assumed that all respondents had equivalent amounts and quality of instructional experience.

The study assumed that computer-based information systems were perceived of as being beneficial to graduate students.

Review of Related Literature

This review begins with a theoretical discussion of the concepts of information, information needs, and information use. It proceeds with an overview of the development of computer-based information systems, and it concludes with a review of use studies of online catalogues, online databases, and CD-ROM databases.

The Concepts of Information, Information Needs and Information Use

Debons (1983) offered two different definitions of information, depending on two different viewpoints. If we think of information as a commodity, it can be defined as "a symbol or string of symbols which have potential for meaning". If we think of information from the user's point-of-view, it can be defined as "that which adds to or changes [his or her] picture of the universe". Bouazza (1989) maintained that information is both a commodity and a process: "information is a commodity that has to be acted upon by an energy system [the receiver], in order to make it useful and allow it to be put into action". The conversion of information into a usable form involves the transmission, processing and utilization of the commodity.

Information need has been defined by Havelock (1979) as "the dynamic forces which create instability within the person-system, and which lead to a cycle of behaviors that ultimately will correct this instability". Information use is a means of correcting the instability that arises from an information need. The definition of information use is based on an assumption of information need. For example, Bouazza (1989) defined information use as "a seeking behavior that leads to the use of information in order to meet an individual's need".

The concept of information need is difficult to measure, because it "involves a cognitive process which may operate on different levels of consciousness and hence may not be clear even to the inquirer himself" (Brittain, 1975). Thus it is possible for an individual to have: unconscious information needs, conscious information needs which are translated into information use, and conscious information needs which are not translated into information use.

The concept of information use is easier to measure, because the demand that a user makes upon an information service can be recorded (Brittain, 1975). However, the measurement of information use does not take into account either unconscious information needs, or conscious information needs which are not acted upon. When attempting to measure the use of any information system, it is important to study non-users as well as users.

The Development of Computer-based Information Systems

Computers were introduced into libraries in the late nineteen sixties and early seventies as a means of keeping track of library records. At first computers were used in the preparation of library card catalogues, then used in the production of computer output microform (COM) catalogues. Computers also were used to operate automated circulation systems, and to handle other library housekeeping functions. It wasn't until the nineteen eighties that the information retrieval capability of the computer was used to provide online access to library catalogues.

Online searching of commercial and government bibliographic databases began in libraries and information centres in the early nineteen seventies, with trained intermediaries interacting with these systems. The role of the end user was to supply information to the intermediary who would formulate a search strategy and interact with the computer.

End users did not search these systems for a number of reasons: the dissimilarities among different vendors, the number of available databases, the complexities of search strategy formulation and logic, the lack of standardization in database search elements, and the costs of online searching and printing (Mischo & Lee, 1987).

Throughout the eighties, there was an increased interest in teaching end users to search bibliographic databases. There are a number of reasons for this increased interest: the information explosion and the demonstrated value of online information retrieval, the increasing availability of online full-text databases, the availability of microcomputers with telecommunications capabilities, the increasing rate of computer literacy in education, business, and in the professions, the introduction of less expensive, more user-friendly search systems such as BRS-AD and Knowledge Index, the growing awareness by end users of the existence of online databases through magazine articles, conference exhibits and promotion by database producers and vendors, the growing familiarity by library users with online catalogues, the increasing workloads for intermediaries, and the development of front-end and gateway packages to facilitate online searching by untrained users (Mischo & Lee, 1987).

Since 1986, library patrons have been able to access bibliographic databases on CD-ROM. This technology offers a significant improvement over remote online databases, because the costs of telecommunications and connect hour charges are eliminated. However, some problems remain, such as: dissimilarities among the products of different vendors, the number of available databases, the complexities of search strategy formulation and logic, and the lack of standardization in database search elements.

The Use of Online Catalogues

The first reports of use studies of online catalogues appeared between 1980 and 1982. The Council on Library Resources funded a number of organizations to conduct studies using a variety of different methodologies in a number of libraries. The results of these studies represent the responses of over 10,000 individuals (Matthews, Lawrence & Ferguson, 1983; Kaske & Sanders, 1983; Markey, 1984). What they showed most clearly was that most users "took to online catalogues like ducks to water" (Lewis, 1987, p. 153). When given a choice between card catalogues, microfiche catalogues or online catalogues, online catalogues were preferred by a large majority of users (Lewis, 1987; Nielson, 1986; Wayland, 1982).

Online catalogue users were demographically essentially the same as card catalogue users (Lewis, 1987, p. 154). The user characteristic most frequently associated with online catalogue use was library experience: frequent users of online catalogues were found to be frequent library users.

In academic libraries surveyed in the Council on Library Resources studies (Matthews, Lawrence & Ferguson, 1983), 77-84% of the catalogue users reported using the library weekly. Almost two thirds of the users of online catalogues reported using them either "most visits" or "occasionally". An additional 21% reported using the catalogues every visit. In academic libraries, most users of the online catalogue used it for course-related work (74%) or for research (38%).

Online catalogue users were not necessarily users of other computers: slightly more than one third had never used another computer system (36%). The library and its online catalogue represented the first experience with computer technology for this group of users.

Non-users of Online Catalogues

Studies of non-users have identified a number of reasons for non-use (Matthews, Lawrence, & Ferguson, 1983): 45% had not taken the training, 40% had no time to learn, 41% had no need, 30% did not know about it, 29% were infrequent users, 18% did not know where it was located, 16% felt the card catalogue was easier to use, and 9% feared using computers.

Non-users of online catalogues tended to be less frequent users of the library, and had less prior contact with computer technology in general (Matthews, Lawrence & Ferguson, 1983). More non-users of the online catalogue came from the following disciplines: business-management, arts and humanities, and engineering.

In a study of card versus online catalogue use at the main library at The Ohio State University, Pease and Gouke (1982) found that online catalogue use increased as users gained experience, while card catalogue use decreased. However, a group of online catalogue users was identified, who had returned to the card catalogue after unsuccessful online search experiences.

Matthews, Lawrence & Ferguson (1983) found that some sixteen percent of non-users considered the online catalogue harder to use than the card catalogue. However, three fourths of the non-users expected to become users in the future. Of these, 90% expressed a favorable attitude toward the online catalogue, and 64% felt it would be easy to learn. Matthews, Lawrence, and Ferguson (1983) pointed out that there is a lack of correspondence between the expressed attitudes toward the catalogue and the behavior of the non-users of the online catalogue, which suggests a fear of the online catalogue and a reluctance to admit it.

How Users Learn to Use Online Catalogues

Lewis (1987) reported that the Council on Library Resources studies indicated that users learned about the existence of online catalogues by seeing terminals in the library, and most often they learned to use them by themselves. The majority of users learned through printed instructions or signs (53%), 30% learned with the assistance of library staff, and 29% learned from instructions displayed on the screen. It should be noted that the online catalogues studied in the Council on Library Resources studies varied according to the amount of instruction available online. Matthews, Lawrence and Ferguson (1983) categorized online catalogues as having three levels of instruction: no instruction, one form of instruction - either online instructions or a help feature, or two forms of assistance - online instructions and a help feature. Among users who reported learning to use the catalogue from the computer screen, 34% used online catalogues with both online instructions and help features, but 29% who reported learning from the computer screen used catalogues with no explicit online aids! Matthews, Lawrence and Ferguson questioned what instructions were used by these users.

An increase in the number of printed aids available online does reduce the need for staff help. Only 15% of the users of online catalogues with both printed instructions and a help feature needed help from a library staff member, while 26% of the users of systems with no aids needed help from a library staff member.

Scharf and Ward (1989) studied how users of an online catalogue with advanced online instructions and a help feature learned to use the catalogue. They found that 45% of users learned to use the catalogue through on-screen instruction, 38% learned to use the catalogue through print, 8% learned through library staff, 5% learned through a fellow student, 2% learned in a class, and 2% learned by other means.

Markey (1984) studied six university libraries, and discovered that all provided help to online catalogue users from reference librarians and from printed instructions or brochures. In addition some libraries provided instruction via videotape, computer-assisted instruction, demonstrations, and workshops. Some libraries provided instruction as part of library orientation or instruction programs. Of the users surveyed by Markey, 34% learned from printed instruction, 19% learned from instructions on the screen, 19% learned from library staff, 13% learned alone without any help, 10% learned from a friend or someone else at the terminal, 4% learned during a library orientation, and 1% learned from media. During focus group interviews, Markey discovered sets of users who refused to ask for help from library staff, and wanted to teach themselves on their own time and at their own convenience. Other users hesitated to ask library staff for help because they were embarrassed and self-conscious about disclosing their topic to anyone else.

Is Online Catalogue Instruction Necessary?

In a study conducted at the University of Petroleum and Minerals Library, Ashoor & Khurshid (1987) found that only 25% of online catalogue users indicated a need for an instructional program. However, the science and engineering students and faculty involved in this study may not be comparable to education students in terms of need for instruction on the use of computer systems.

Lawrence, Graham & Presley (1984) found that most new users of an online catalogue at the University of California had little trouble with the system: 75% made no errors during their sessions, and the help facility was used only in about 15% of the search sessions. In a study of online catalogue users in the Tarrant County Junior College District library system, Wayland (1982) found that

69% of the users had received no online catalogue training.

Marchionini & Gattone (1985) explored the behavior of graduate students who were searching an online catalogue for the first time. Students were given both simple and complex searches to conduct on the online catalogue. They reported the system to be easy to use with no instruction, and seldom used the online help function. Based on this finding, Marchionini concluded that "substantial resource investments in training materials seem imprudent" (Marchionini & Nitecki, 1987).

In spite of the finding that users tend to learn to use the online catalogue without formal instruction, the need for some form of training or instruction has been documented in a number of studies. The Council on Library Resources studies found that training and assistance were associated with more satisfied and successful users (Matthews, Lawrence & Ferguson, 1983). Nielson and Baker (1987) found that new online catalogue searchers who received instruction (whether provided through a workshop or through a printed brochure) out-performed online catalogue searchers who had received no instruction.

In a study of transaction logs at Northwestern University, Dickson (1984) examined author and title searches that had resulted in zero hits. She found that two errors caused most of the problems - uninverted names and titles with initial articles. One of her suggestions was that better instructional programs should be offered.

Janosky (1986), observed 30 first-time online catalogue users, and found that they generally did not read the entire contents of the offline help instructions. They did not even read the entire contents of one section of the help feature. They appeared to make judgments about how much information was needed and then stopped reading. The users failed to note the presence of related information, unless it was found in close proximity to the information first noted.

In a study conducted at the University of Maryland at College Park, Marchicnini & Nitecki (1987) found that first-time users of an online catalogue only searched online, and did not search in card catalogues or on serials lists, in spite of the fact that prominently displayed signs in the library indicated that the online catalogue did not contain all the items in the card catalogue.

What type of Instruction Should Be Provided?

Based on evidence that first-time online catalogue users did not read printed instructions regarding the contents of the catalogues, Marchionini & Nitecki (1987) concluded that library instruction may need to focus on the many sources of information available in academic libraries, rather than on the mechanics of using a particular system. Because many users can learn to use online catalogues, with no help or with the help of online or off-line printed aids, these seem to be the most cost-effective means of providing help to users. Alternatives to printed instructions should be provided for the minority of learners, who cannot learn to use the catalogues by using printed aids. This instruction could be provided via reference librarians on a one-to-one basis, or via short, intensive units, in a variety of media that allow self-directed study (Marchionini & Nitecki, 1987).

Reactions of Students to Various Methods of Learning

Scharf and Ward (1989) reported on the reactions of students to various learning methods, when introducing a second online catalogue with advanced online instruction and help features. When students were asked to indicate which are "good" ways to learn to use the catalogue, they responded as follows: 85% chose special class sessions, 76% chose library demonstrations, 75% chose online help menus and instruction, and 57% chose printed instruction.

Matthews, Lawrence and Ferguson (1983) noted that most users tended to be satisfied with whatever training or instruction they received. Only 11-15% of users were unsatisfied with printed instructions or with personal assistance received.

Scientists, Researchers, and Business Professionals as End Users

The goal of formal training programs offered by library and information centre staff has been to extend online searching into the work environment of the professional. But the high level of initial enthusiasm for direct online searching has not translated into a continuing commitment to search. Studies indicate that a substantial percentage of the trained end users do not continue searching after training.

Richardson (1981), reporting on an end user study involving 20 engineers or scientists, indicated that only six of them remained relatively active as searchers. User searching was characterized by high initial enthusiasm, followed by a period of settling out, leaving a final cadre of proficient users. However, overall levels of usage were low considering that the first seven months of searching were absolutely free of charge.

Haines (1982) and Haines, Najjar & Wehner (1986) reported on two studies at Kodak Research Laboratories to teach 75 scientists to search chemical databases. A total of 38% of the scientists in 1982, and 32% of the scientists in 1986 remained as regular searchers.

Walton & Dedert (1983) reported that 50% of the chemists trained as end users at Exxon were doing their own database searching several months after the training session. However, Walton and Dedert also reported that the long-term success rate for an earlier group of end-users was 0%: no one continued searching.

Bodke-Roberts (1983) trained ten faculty members in the life sciences to conduct their own searches. These faculty members were familiar with searching, because all had used intermediaries to conduct their searches in the past. After four months of training, 40% continued searching.

Poisson (1986) reported on two studies of end user training of medical staff on BRS-AD and MEDLINE at New York Hospital, Cornell Medical Centre. Fifty percent of the staff attended at least one class, but only 8% in the first study, and 7% in the second study became frequent searchers.

Glasgow and Foreman (1986) trained more than 150 health sciences faculty, staff, and students at the University of Minnesota to search BRS-AD and BRS

Colleague. They found that 48% had not signed up to search, and 44% of those not searching had decided against doing their own searching.

Montgomery (1987) described a study in which 32 scientists and technologists at a product development sight of the Proctor and Gamble Co. were taught to conduct online searches. The 32 trainees conducted only 34 searches in a nine month period. Half the trainees had not conducted any searches; while more than half the searches were conducted by two persons.

Horner and Thirlwall (1988) conducted a study of researchers at the University of Manitoba to determine the extent of database use by social sciences and humanities researchers, most of whom had not received any formal instruction. They found that social sciences researchers reported using databases slightly less than science and technology researchers, with humanities researchers significantly less active than others. There was considerable departmental variation among the researchers who reported searching databases.

Several reasons have been cited for the poor success rates in training scientists, researchers, and business professionals to use online systems: the inconvenience of searching, infrequency of searching, convenience of using intermediaries, problems and difficulties with the systems, difficulties with the microcomputer, other pressing demands on the users' time, and the high cost of searching (Mischo & Lee, 1987).

End User Training in University Libraries

A number of university libraries first set up end user search services, following the introduction of BRS-AD in 1983. The lower off-peak hourly rates, and the "user friendly" interface made database searching more accessible to users. A number of libraries have reported high rates of use, particularly among graduate students.

At the University of Ottawa, BRS-AD searching was made available to end users on a drop-in basis, starting in 1983. By April, 1984, 227 end user searches had been performed, with graduate students making up 44% of the total (Janke, 1984).

In 1984, the University of Michigan offered BRS-AD searching at no cost to users. Graduate students comprised 44% of the total of 450 users who used the system in the fall of 1984 (Crooks, 1984).

In 1985, the University of Pittsburgh established an experimental end user search facility (Brody, Whitmore, & McCormick, 1986). Between February and December of 1985, a total of 5237 users performed 25,445 searches at no charge. Fifty-six percent of the users were graduate students.

Mischo & Lee (1987) have pointed out that end user searching seems to hold particular attraction for graduate students. Yet studies of use patterns suggest that use varies considerably among the students.

In a study of online searching use patterns at the Lippincott Library of the Warton School, at the University of Pennsylvania, Littlejohn (1987) found that after a lecture and demonstration, a small core of experienced searchers developed, who repeatedly returned to use the service. In addition to the core of steady searchers, there was a steady flow of new searchers - most of whom were graduate students.

Curtis (1987) studied participants in a BRS-AD training session at Mann Library at Cornell University. After the training session, only 47% of the participants conducted online searches.

The Rate of Searching

Because they tend to search databases infrequently, many searchers will remain novices (Mischo & Lee, 1987). Janke (1984) reported that 80% of end users at the University of Ottawa searched less than once a month. Friend (1985) reported that 72% of the end users in her study searched once a month or less.

Non-users of Databases

A few studies have attempted to find out why potential users of databases do not do so. Horner and Thirlwall's (1988) study of database searching at the University of Manitoba attempted to identify reasons for non-use. Access to terminals was not a major problem (91% of social science researchers had access to a terminal; while 76.9% of humanities researchers had access). A large number of researchers indicated that pertinent databases were not available (76% of humanities researchers and 41.2% of social science researchers). However, when they were asked to indicate which printed indices they searched, the majority of the indices were searchable in database format. This suggests that a significant number of researchers did not know what databases existed.

Non-users of databases were interviewed as part of Montgomery's (1987) study of database searching by scientists and technicians at a Proctor and Gamble product development site. Work-related reasons for non-use included: lack of time, lack of project need, ability to delegate searching, availability of other information sources, newness of searching, the fact that no one else was doing it, the confidential nature of the work, and the lag between training and need. Computer-related reasons for non-use included: problems using or setting up equipment, a feeling of inadequacy, and the problem of just not getting started. Training-related reasons for non-use included: lack of time to relearn, forgetting how to search, and lack of practice. The most commonly cited reasons were computer problems and lack of time. When non-users were asked what they needed to become users, they mentioned: a need, time, help setting up equipment, more training and someone to help them.

In an evaluation of BRS-AD at Cornell University, Curtis (1987) questioned participants who learned to search BRS-AD, but only did so once. Forty-six percent had no further need for information, 19% avoided searching because they would have had to pay, 11.5% were dissatisfied with the results, 11.5% found it too expensive, and 8% had difficulty scheduling another appointment.

How Effective Are End User Searches?

While end users indicate overwhelming satisfaction with searches, analysis of search results using standard retrieval measures shows that end users are not performing particularly effective searches. Several studies have attempted to evaluate end user searching by comparing the results of searches performed by end users with the results of searches on the same topic conducted by a trained intermediary.

Kirby and Miller (1986) asked end user searchers on BRS Colleague to compare their searches with searches done by intermediaries. Of the searches initially judged successful by end-users, 54% discovered they were missing important articles, after comparing their results with the intermediary searches. Most end user failures were due to problems with search strategy.

Penhale and Taylor (1986) compared the search results of students and librarians. They found that in a given amount of time, librarians retrieved five times as many highly relevant citations and about two times as many relevant citations as did the students. The major problem faced by student searchers was the development of a good search strategy. Students used fewer search terms than librarians, and did not use many alternative ways to narrow or broaden searches.

Poisson (1986) compared searches conducted by medical end users with those of experts, and found that 60% of the end users retrieved only 12-22% of the relevant articles retrieved by the experts. Users had particular problems with search strategy formulation and with the use of Boolean logic.

Sewell and Teitelbaum (1986) studied transaction logs of end users. They found that about one-half to two-thirds of the searchers had some technical problem in their searches, and almost 30% contained significant uncorrected logic or command failures.

Is Instruction Needed?

There are several studies which have looked at users' needs for assistance and instruction when learning to search databases. Trzebiatowski (1983) studied 20 end users, who had been given training at the University of Wisconsin. Only three performed their searches without any assistance. Only 5% considered the training session "not necessary".

Littlejohn (1987) surveyed database searchers at the Lippincott Library, University of Pennsylvania. Instruction consisted of a one hour introduction and demonstration at the beginning of the semester, along with a printed aid and lists of database descriptions. In spite of this instruction, library staff invariably walked first and second time users through their searches. Sixty percent of users reported that individual instruction by a librarian was the greatest contributor to knowledge of searching. At the University of Michigan, Crooks (1984) found that 85% of the new database users needed library staff assistance during their searches.

Friend (1985) asked first-time users in a graduate course in Educational Psychology about the level of staff help they wanted while learning to search. A large majority (80%) wanted a librarian with a knowledge of BRS searching and a knowledge of the academic subject area. Four students felt that someone with basic BRS training, but with minimal background in the subject area would be adequate. Once users gained experience, about half felt they could get by alone, but half said they still needed someone with BRS training.

Montgomery's (1987) study of scientists and technologists at Proctor and Gamble used two workshop formats - a one day workshop and a two hour workshop, which covered the same material in less time. He divided participants into two groups, and, after balancing for a number of variables, such as age, experience, degree held, and degree subject, he gave one group a two hour workshop and one group the day long workshop. He found there was no significant association between length of training and the decision to search or not after the workshop.

Preferred Methods of Learning to Search Online Databases

Simon (1986) surveyed end users of BRS-AD in a health sciences library, and asked them to rank a number of training methods. The most popular method was "learn by using", followed by individual instruction, followed by CAI, followed by workshops, with reading manuals being the least popular.

A study conducted at Texas A&M, compared a slide/tape program, a printed manual, and a CAI program in an effort to arrive at the most satisfactory instructional method (Jaros, Anders & Hutchins, 1986). CAI was favored by users, but analysis of the search results indicated that the printed manual was the most effective.

At Carnegie-Mellon University, end users were asked to rank sources of assistance (Pisciotta, Evans & Albright, 1984). Their choices in order of popularity were: asking a friend, using online help, getting help from library staff, asking anyone who was available, and using the system manual.

The Use of CD-ROM

In a study of the use of 20 CD-ROM products introduced at Vanderbilt University, Steffey and Meyer (1989) discovered a tremendous variation in frequency of use of the various systems. The most heavily used system was PsycLIT on Silver Platter software, which accounted for 20% of the total use. ERIC on Silver Platter was the next most heavily used system. It accounted for 12.4% of total use. At the other end of the scale, five products were used less than six times in total over an 18 month period.

Users of CD-ROM

A study of CD-ROM users at Vanderbilt University (Steffey & Meyer, 1989) revealed that 48% were undergraduates, 38% were graduate students or professionals, 7% were faculty, 4% were staff, and 5% were others. At the Education Library, however, a higher proportion of faculty and graduate students used CD-ROM than in other libraries on campus: 14% of users were faculty, and 50% of users were graduate students.

Steffey & Meyer (1989) found that the main reasons for using CD-ROM products were to get information for a research paper or project (44%) or to complete a class assignment (37.6%).

A study of users of CD-ROM at The Ohio State University Health Sciences Library (LePoer & Mulurski, 1989) revealed that 49% of the users used it for faculty or graduate research, 46% used it for class assignments, and 25% used it for patient care information. Of the total users, 64% were students, 19% were staff, 14% were faculty and 3% were other users. They used CD-ROM because it was convenient (91%), it brought quick results (80%), and it was free (77%).

Steffey and Meyer (1989) found that 38% of the participants in their study used computers regularly, 9% had no computer experience, and 2.5% had no computer experience except with the library's online catalogue. Those who had less experience with computers found the systems more difficult to use than those with more computer experience.

Lynn and Bacsanyi (1989) surveyed users of four CD-ROM systems at the Purdy/Kresge Library at Wayne State University. The majority of the users reported being comfortable with computers. Only 13% reported no previous experience with computers.

Methods for learning to use CD-ROM products

LePoer and Mulurski (1989) found that most users learned about CD-ROM through informal channels: they learned about it from other users, from library staff, or just by seeing it in the library. The majority of the users learned from one-on-one instruction from library staff (40%), an in-house user manual was used by 28% of users, trial-and-error was used by 15% of users, colleagues taught 9%, and instructions on the computer screens were used by 8%. Experienced searchers were asked about their needs for assistance. Occasional help was needed by 58%, 19% needed help only for the first search, 19% never asked for help, while 4% needed help every time they searched.

When searchers were asked about the type of help they needed, it fell into two categories: help with the search, and help with the equipment. The type of help most requested was help in developing an effective search strategy (35%), or help in developing alternatives to ineffective search strategies (20%). Requirements for help with equipment included: coping with the printer (32%), getting the system started (28%), and solving computer problems (22%).

Steffey & Meyer's (1989) study of CD-ROM users at Vanderbilt University found that 72% of users learned from library staff, 20% learned through trial-and-error, and 17.8% used online help screens. They noted that there was a tremendous variation in how users in the various campus libraries learned to use the CD-ROM products. A very high rate of Education library users (91.5%) learned from library staff, while only 55% of users at the Science library learned from library staff. No explanation of this difference was offered by the researchers.

Preferred Methods of Learning to Use CD-ROM

Steffey and Meyer (1989) asked users to rate the learning methods by ease of use. On-disc tutorials were rated as easiest. However, it should be mentioned that many of the products studied did not have on-disc tutorials.

Lynn and Bacsanyi (1989) reported that: 52% of CD users at the Purdy/Kresage Library at Wayne State University preferred individual instruction on demand, 51% preferred CAI, 37% preferred training sessions on an announced scheduled basis, 24% preferred written handbooks with assignments, 20% preferred peer instruction, 13% preferred instruction within subject classes, and 3% felt that CD-ROM instruction should be a part of the formal library instruction program.

Is Formal Instruction Necessary?

LePoer and Mulurski (1989) asked experienced users of CD-ROM products to evaluate their search results. Only 13% found all citations useful, 46% found three quarters useful, 22% found half useful, and 20% found a quarter useful. These findings indicate that end users are not very efficient searchers. LePoer and Mulurski suggested that training and/or experience could improve the precision of their searches.

Allen (1989) studied the results of searches conducted by users of InfoTrac (a general CD-ROM database) at the University of Illinois, Urbana-Champaign, and discovered that: 62% found some information on the topic, 25% felt they had successfully answered the question, and 23% were unsure whether or not they had answered their question. In spite of this relatively low success rate, the majority of these users felt that formal instruction was not necessary. Of the users, 72% indicated that formal instruction was not required to use CD-ROM, and 35% indicated that some assistance was required. Allen interviewed users who did not find any citations, and noted that some of those who experienced failure did not feel that assistance was needed. According to Allen: "It appears that even failure cannot overcome the reluctance of some patrons to ask for help" (p. 107). However, Lynn and Bacsanyi (1989) found that only 16% of CD-ROM users at the Purdy/Kresage Library at Wayne State University said that formal instruction was unnecessary.

Steffey and Meyer (1989) found that users who had received classroom instruction reported a higher degree of satisfaction with the number of citations retrieved and placed a greater value on their results. Yet they also noted that the number of people using tutorials or attending advertised classes on searching was "sadly too low" (p. 39).

Improvements Suggested

Steffey and Meyer (1989) asked CD-ROM users to suggest improvements to the service being offered. Suggestions included: the need for more work stations and more CD-ROM based products, complaints about hardware problems, the need for more training, and requests to relate the library's catalogue to the CD-ROM systems, to eliminate the need to search two systems.

Summary of the Literature Regarding the Use of Computer-based Information Systems

1. Of the users of online catalogues, about 77-84% are regular users (Matthews, Lawrence, & Ferguson, 1983).
2. Only a third to a half of those trained to search online databases will search again (Richardson, 1981; Haines, 1982; Bodke-Roberts, 1983; Haines, Najjar & Wehner, 1986; Curtis, 1987; Montgomery, 1987), but a small core of steady searchers will develop (Richardson, 1981; Poisson, 1986; Littlejohn, 1987; Montgomery, 1987).
3. Most searchers of online databases do not search on a regular basis: only 20-27% are regular searchers (Friend, 1985; Janke, 1984).
4. The use of computer-based information systems seems to vary by department. Online databases are most likely to

be searched by researchers in science and technology, followed closely by researchers in social sciences, with researchers in the humanities being least likely to search (Horner & Thirlwall, 1988). Use rates of online catalogues are related to disciplines (Matthews, Lawrence, & Ferguson, 1983). Use of various CD-ROM systems varies tremendously, with PsycLIT being used most, followed by ERIC (Steffey & Meyer, 1989).

Summary of the Literature Regarding Non-users of Computer-based Information Systems

1. The most commonly cited reasons for not using online catalogues are: lack of instruction, lack of time, lack of need, not knowing about it or where it was located, lack of practice, use of print equivalent, computer anxiety, and lack of success (Pease & Gouke, 1982; Matthews, Lawrence & Ferguson, 1983).
2. Reasons cited for not using online databases are: lack of time, computer problems, lack of need, cost, dissatisfaction with results, lack of knowledge regarding what is available, difficulty scheduling an appointment, ability to delegate searching, availability of other information systems, lack of time to relearn, forgetting how to search, newness of searching, confidential nature of work, lag between training and need, equipment

problems, and feelings of inadequacy (Horner & Thirlwall, 1988; Montgomery, 1987; Curtis, 1987).

3. When non-users are asked what they need to become users, they list: a need, time, help setting up equipment, more training and someone to help them (Montgomery, 1987).

Summary of the Literature Regarding Learning Methods

1. The majority of online catalogue users learn from printed instructions, either online or off-line (Lewis, 1987; Markey, 1984). Other methods of learning to use the online catalogue include: learning from library staff, learning from friends or someone else at a terminal, library instruction (such as workshops or demonstrations), and media (such as videotape or computer-assisted instruction) (Markey, 1984; Lewis, 1987).

2. Training and assistance for users learning to use the online catalogue are associated with more satisfied and successful users (Matthews, Lawrence & Ferguson, 1983; Nielson & Baker, 1987; Dickson, 1984; Janosky, 1986; Marchionini & Nitecki, 1987). Those who receive formal instruction on using CD-ROM databases are more satisfied with the results (Steffey & Meyer, 1989).

3. Most online catalogue users tend to be satisfied with whatever learning method(s) they use. Only 11-15% of

online catalogue users are unsatisfied with the method they use (Matthews, Lawrence & Ferguson, 1983).

4. Printed instructions are the most cost-effective means of providing instruction, but are one of the least favoured by users (Simon, 1986; Jaros, Anders & Hutchins, 1986; Pisciotta, Evans & Albright, 1984).
5. An increase in the number of printed aids reduces the need for staff help (Scharf & Ward, 1989).
6. Preferred methods of learning the online catalogue are "human methods" - usually individualized instruction (Simon, 1986; Pisciotta, Evans & Albright, 1984).
7. There are variations among campus libraries regarding how users learn to use CD-ROM products (Steffey & Meyer, 1989).
8. There are users who refuse to ask for help from library staff, but who prefer to learn at their own time and their own convenience (Matthews, Lawrence & Ferguson, 1983; Markey, 1984).

Summary of the Literature Regarding the Level of Help Wanted for Online Database Searching

1. Even with instruction and printed aids, searchers need help from library staff (Littlejohn, 1987).
2. Training and assistance from library staff are considered essential by 85-97% of online database

searchers (Trzebiatowski, 1983; Littlejohn, 1987; Crooks, 1984; Friend, 1985). While learning to search, the large majority of online database users want help from a librarian with knowledge of the system as well as knowledge of the academic subject (Friend, 1985).

3. There is no significant association between the length of training and the decision to search or not (Montgomery, 1987).

Summary of the Literature Regarding Suggestions for Improving Service

1. Suggestions for improving CD-ROM service include: more CD-ROM stations, more products, more help in solving hardware problems, provision of more training, and linking CD-ROM products to the online catalogue (Steffey & Meyer, 1989).

Summary of the Literature Regarding Previous Computer or Library Use

1. Online catalogue users are not necessarily users of other computers (Matthews, Lawrence & Ferguson, 1983).
2. The characteristic most associated with online catalogue use is previous experience with using libraries (Lewis, 1987).

3. Users with less computer experience found CD-ROM systems more difficult to use than those with a great deal of experience (Steffey & Meyer, 1989).

Although much was known about the use of computer-based information systems, when this study was started, little was known about the use of these systems by education graduate students at the University of Alberta. Some of these "unknowns" were investigated in this study, including:

1. the rates at which the available computer-based information systems were being used, and the potential for increasing their use,
2. the instructional methods used, students' satisfaction with the various methods, and the time in their programs when students wanted to receive instruction,
3. the reasons for non-use of the systems, and
4. the actions the Library or the Departments could take to increase students' use of the systems.

Since this information has not been gathered or analyzed before, it will make a unique contribution to the literature on the introduction of computer-based information systems in libraries: how users adapt to the systems, and how they can be encouraged to move from print-based to computer-based systems.

Research Design

The problem addressed by this research is: what are the use patterns of computer-based information systems by graduate students in the Faculty of Education at the University of Alberta; how in their opinion can their use of computer-based information systems be increased?

Since information use is a behavior, data can be collected in a number of ways: by asking people about their behavior, by observing people's behavior, and by examining their artifacts. The method chosen for this study is asking people about their behavior. In addition to asking about information use, participants can be asked about their information needs, the methods they use to satisfy those needs, and reasons for their behavior.

In this study, the descriptive survey methodology was used to gather data on use (and reasons for non-use) of selected computer-based information systems available in the Education Library. To gather the data, questionnaires were sent to Faculty of Education graduate students.

The Sample

The sample in this study consisted of graduate students in the Faculty of Education who were registered in a basic research course in 1989. This restriction ensured that all students in the study had received instruction on at least one computer-based information system, because all students in basic research courses are given a BRS-AD workshop by the Education Library staff. During the workshop, students spend an hour searching BRS-AD. After the workshop, all the students are offered one hour of free searching on BRS-AD.

The sample was further restricted to graduate students who were still registered as of January, 1990. This restriction was added to ensure that students in the study were registered at the University of Alberta, when all the systems and associated services were in place.

The number of students in the research sample was 216. A comparison between the research sample and the total graduate student enrollment in the Faculty of Education is displayed in Table 1. It should be noted that the Department of Adult, Career and Technology Education is over-represented in the research sample, and the Department of Educational Psychology is under-represented.

Of the 216 students in the research sample, 130 responded to the questionnaire, for a response rate of 60%. The proportion of respondents from each Department closely paralleled the proportion of the research population from each Department. (see Table 1)

Table 1

Enrollment, Sample and Respondents by Department

Department	Enrollment*			Sample			Respondents		
	n	%	σ^2	n	%	σ^2	n	%	σ^2
ACT	100	(12%)	2.2	47	(22%)	.6	32	(25%)	.8
ADM	214	(25%)	5.7	46	(21%)	.5	31	(24%)	.7
ELE	77	(9%)	5.2	18	(8%)	1.5	10	(8%)	1.1
FDN	84	(10%)	4.2	23	(9%)	.8	12	(9%)	.7
PSY	290	(33%)	24.6	57	(26%)	2.0	34	(26%)	1.2
SEC	101	(12%)	2.1	25	(9%)	.6	11	(9%)	.9
TOTAL	866			216			130		

*As of Dec. 1, 1988 (University of Alberta, 1989b, pp. 2-42-43).

When the questionnaire respondents were compared to the graduate student enrollment in the Faculty of Education, the proportion of students in the programs was found to vary. A larger proportion of the respondents were registered as Master's students and fewer were registered as PhD students, when compared to the total enrollment. (see Table 2)

Table 2

Enrollment and Respondents by Program

Program	Enrollment*			Respondents		
	n	%	σ^2	n	%	σ^2
PhD	298	(34%)	.1	22	(17%)	3.4
Master's**	545	(63%)	76.0	108	(83%)	32.8
Other***	23	(3%)	81.0	0		14.0
TOTAL	866			130		

* As of Dec. 1, 1988 (University of Alberta, 1989b, pp. 2-42-43)

** Includes qualifying students

*** Includes Diploma, Probationary, Visiting and Special students

Specific Procedures

The following steps were taken in conducting the study:

Nov. 1989: The questionnaire was developed, piloted and revised.

Dec. 1989: The research proposal and questionnaire were submitted to the Ethics Review Committee.

Feb. 1990: The questionnaire was mailed to graduate students. (see Appendix 1)

March 1990: The follow-up letter was sent to non-respondents. (see Appendix 2)

April 1990: The questionnaire responses were analyzed.

Instrumentation and Pilot Study

The questionnaire was developed to gather data to assist management in the Education Library to set a direction for the development of computer search services. Some of the decisions faced by management included: which of the available computer-based information systems and associated programs should continue to be supported by the library? which of the available computer-based information systems and associated programs need to be improved? and which new computer-based information systems and associated programs should be introduced?

Before the questionnaire was sent out, a pilot study was conducted with several graduate students who had received instruction on BRS-AD in 1988 or in 1990, and were not included in the study. The questionnaire was revised as indicated by the students' responses. A copy of the questionnaire and accompanying letter sent to the graduate students in the research sample is included in Appendix 1.

There is no data available regarding the validity or the reliability of the questionnaire.

Findings

Because of the number of sub-problems in this study, findings will be grouped under each of the seven sub-problems.

Findings Relating to Sub-problem One

Findings relating to sub-problem one include: the rate of use of BRS-AD, methods of learning to use BRS-AD, and non-users of BRS-AD.

The Rate of Use of BRS-AD

All 130 students participating in this study had attended a compulsory BRS-AD workshop, as part of a research course. The workshop consisted of a lecture and a lab where students could search BRS-AD. After the workshop, the equipment and assistance to permit searching were made available to students in the Library. Students were offered one free search, lasting up to an hour in length, followed by the opportunity to search BRS-AD on a paid basis. Findings relating to the use of BRS-AD since the workshop are presented in Table 3.

Table 3

Use of BRS-AD Since the Workshop

Users	Use					
	Once +		Once		Total	
	#	%	#	%	#	%
By Department						
ACT	2	(6)	5	(16)	7	(22)
ADM*	5	(17)	6	(20)	11	(37)
ELE	0		1	(10)	1	(10)
FDN	1	(8)	3	(25)	4	(33)
PSY	5	(15)	11	(32)	16	(47)
SEC	3	(27)	1	(9)	4	(36)
By Program						
MEd-project*	5	(13)	5	(13)	10	(26)
MEd-thesis	5	(7)	15	(22)	20	(30)
Phd	6	(27)	7	(32)	13	(59)
Total users	16	(12)	27	(21)	43	(33)

* Includes one non-response regarding use of BRS-AD.

At the time of the study, only 33% of the students had used BRS-AD since the workshop. There was considerable variation among departments, with a high of 47% for Educational Psychology, and a low of 10% for Elementary Education. Of the students in the PhD program, 59% had used BRS-AD since the workshop, while 26% of the Master's students in the project route and 30% of the Master's students in the thesis route had used BRS-AD since the workshop. Most of the students who had used BRS-AD since the workshop used it only once - for their free search. Only 16 students (12%) used BRS-AD after using the free search.

Methods of Learning to Use BRS-AD

All students in the study learned to search BRS-AD by attending a workshop consisting of a lecture and a lab. They were asked to indicate any methods they would have preferred to have used to learn to search BRS-AD. The results are presented in Table 4.

Table 4

Preferred Methods of Learning BRS-AD by Department

Learning Methods	ACT	ADM	ELE	FDN	PSY	SEC	Total
Workshop	28(88)	24(77)	10(100)	7(58)	30(88)	10(91)	109(84)
Staff	19(59)	11(35)	6(60)	6(50)	17(30)	4(36)	63(48)
Screen	11(34)	13(42)	2(20)	3(25)	7(21)	2(18)	38(29)
Print	7(22)	8(26)	2(20)	3(25)	4(12)	1(8)	25(19)
Total times a preference was indicated							235

Note. No one chose "use another method".

Eighty-four percent of the students preferred the workshop method that they used to learn to search BRS-AD, and 48% indicated a preference for learning from library staff. While the majority of students chose these human methods of instruction, a significant number indicated they preferred to learn from the screen (29%) or from print (19%).

Non-users of BRS-AD Since the Workshop

Non-users are defined as students who had not used BRS-AD since the workshop at the time of the study. Findings relating to non-users are presented in Table 5.

Table 5

Non-users of BRS-AD since the Workshop

Non-users	Potential Use					
	No plans		With plans		Total	
	#	%	#	%	#	%
By Department						
ACT	1	(3)	24	(75)	25	(78)
ADM*	10	(33)	9	(30)	19	(63)
ELE	1	(10)	8	(80)	9	(90)
FDN	1	(8)	7	(58)	8	(67)
PSY	5	(15)	13	(38)	18	(53)
SEC	0		7	(64)	7	(64)
By Program						
MEd-project*	10	(26)	18	(47)	28	(74)
MEd-thesis	8	(12)	41	(59)	49	(70)
Phd	0	(0)	9	(41)	9	(41)
Total non-users	8	(14)	68	(53)	86	(67)

* Includes one non-response regarding use of BRS-AD.

At the time of the study, 67% of the students had not used BRS-AD following the workshop. However, 53% said that they planned to use it, and only 14% said that they had no plans. Of the 18 students who indicated that they had no plans to search BRS-AD, 10 were from the department of Educational Administration, and were registered in the project route. None of the PhD students indicated that they had no plans to search BRS-AD.

Non-users of BRS-AD since the workshop indicated a number of reasons for not using it. These are presented in Table 6.

Table 6

Reasons for not Using BRS-AD Since the Workshop

Reasons	#	%
I use other means of getting information	54	63
I am concerned about cost	35	41
I forgot how to search BRS-AD	24	28
I am anxious about asking for help	14	16
I am anxious about using computers	13	15
I was dissatisfied with the first search	13	15
It takes too much time to use	8	9
I had difficulty scheduling an appointment	8	9
I forgot that it was available	6	7
I have another reason:		
I have no need yet for a major search	20	23
I have enough literature	5	6
I use local systems because of cost	4	5
I am too distant from the library	2	2
BRS is not readily accessible	1	1

Note. Non-users=86

The reason given most often for not searching BRS-AD since the workshop was that students used other means of getting information. Most of the databases available on BRS-AD do have print equivalents, which are available in the University of Alberta Library system.

The reason for not searching BRS-AD since the workshop which was cited second most often was concern about cost. Students who are concerned about cost may not feel it is worth investing in time to learn to use a system that they cannot afford to use again.

The third most often cited reason was forgetting how to search BRS-AD, and when students were given the opportunity to provide another reason, 23% said that they had no need yet for a major search. This finding would seem to indicate that students perceive BRS-AD as a system to be used for a thesis or a major project, but not for term papers or for class assignments.

Open-ended Findings Relating to BRS-AD

A number of the students included comments, in addition to their questionnaire responses. Several students, who said that they had no need yet for a major search, indicated that they did not want to waste time and money, so were "saving" their time for a major search.

One student commented that the lecture and lab were "very good", while another student said that the lab was too rushed, and requested that more lab time be allotted. Two students offered suggestions for improving the program. One suggested that computer novices be paired with partners, who were familiar with computers. Another student suggested that follow-up sessions be offered to reinforce the information - perhaps in the form of regular labs.

Findings Relating to Sub-problem Two

Findings relating to sub-problem two include: the rate of use of the online catalogue, methods of learning to use the online catalogue, and non-users of the online catalogue.

Rate of Use of the Online Catalogue

The use of the online catalogue by students in various departments and programs is presented in Table 7.

Table 7

Use of the Online Catalogue

Users	Rate of Use			
	Once/twice	Occasional	Regular	Total
	# (%)	# (%)	# (%)	# (%)
By Department				
ACT	0	1 (3)	31 (97)	32 (100)
ADM	1 (3)	9 (29)	19 (61)	29 (94)
ELE	0	0	10 (100)	10 (100)
FDN	0	0	11 (92)	11 (92)
PSY	4 (12)	1 (3)	29 (85)	34 (100)
SEC	0	2 (18)	9 (82)	11 (100)
By Program				
MEd-Project	1 (3)	9 (23)	26 (66)	36 (92)
MEd-Thesis	2 (3)	4 (6)	63 (88)	69 (100)
PhD	0	0	22 (100)	22 (100)
Total Users	5 (4)	13 (10)	109 (84)	127 (98)

A total of 127 students had used the online catalogue at the time of the study, for a mean use rate of 98%. Most of the users (84%) rated themselves as being regular users. Among the PhD students, 100% rated themselves as regular users, compared to 88% of the students in the thesis route and 66% of students in the project route. Among students in the Department of Educational Administration only 61% rated themselves as being regular users. This is considerably less than the 82-100% reported by the other Departments. It should be noted that the ten students in Educational Administration who had used the online catalogue once or twice, or occasionlly were registered in the project route.

Methods of Learning to Use the Online Catalogue

Students were asked which of six methods they used to learn to use the online catalogue, including: following instructions on the computer screen, learning from a library staff member, learning from another student, following print instructions, attending a workshop, or learning from an instructor. The 127 students who had used the online catalogue were asked to rate the methods they used as being satisfactory or unsatisfactory. Methods rated as being satisfactory are presented in Table 8, and methods rated as being unsatisfactory are presented in Table 9.

Table 8

Satisfactory Methods of Learning the Online Catalogue

	Department						
	ACT	ADM	ELE	FDN	PSY	SEC	TOTAL
Methods	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)
Screen	21(66)	21(68)	8(80)	9(75)	20(59)	7(64)	86(68)
Staff	19(59)	14(45)	9(90)	5(42)	20(59)	4(38)	71(56)
Student	7(22)	3(10)	2(20)	3(25)	3(9)	2(18)	20(16)
Print	3(9)	3(10)	3(30)	2(17)	3(9)	1 (9)	15(12)
Workshop	5(16)	2 (6)	2(20)	1 (8)	4(12)	1 (9)	15(12)
Instructor	1 (3)	2 (6)	0	1 (8)	1(3)	0	5(4)
Number of times a method was rated satisfactory							212

Note. Users=127

The number of times a method was rated as satisfactory was 212, which represented 89% of the methods used. The computer screen and library staff were the two satisfactory methods used by the largest number of students. Most of the satisfactory methods are informal: - the computer screen, library staff, other students, and print materials. The easy-to-use menus of the online catalogue probably help to account for this finding.

Table 9

Unsatisfactory Methods of Learning the Online Catalogue

	Department						
Methods	ACT	ADM	ELE	FDN	PSY	SEC	TOTAL
	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)
Screen	5(16)	2(6)	1(10)	1(8)	4(12)	2(18)	15(12)
Print	1(3)	1(3)	0	0	2(6)	0	4(3)
Workshop	0	1(3)	0	0	2(6)	0	3(2)
Student	2(6)	0	0	0	1(3)	0	3(2)
Staff	0	0	0	0	1(3)	0	1(1)
Instructor	0	0	0	0	1(3)	0	1(1)
Number of times a method was rated unsatisfactory							27

Note. Users=127

Eleven percent of the methods used by students to learn to use the online catalogue were rated as unsatisfactory. The method rated as being unsatisfactory by the largest percentage of students (12%) was following instructions on the computer screen. No other method was rated unsatisfactory by more than three percent of the students. It should be noted that students who indicated that a particular method was unsatisfactory also used an another method which was satisfactory.

Preferred methods of learning to use the online catalogue. Students were asked to indicate any methods they would have preferred to have used to learn to use the online catalogue. Preferences for methods other than, or in addition to the one(s) that they used are presented in Table 10.

Table 10

Preferred Methods of Learning the Online Catalogue Other Than or in Addition to the Method(s) Used

Learning Methods	Group ACT	 ADM	 ELE	 FDN	 PSY	 SEC	 TOTAL
	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)
Workshop	12(38)	6(21)	1(10)	4(36)	7(21)	2(18)	32(25)
Staff	7(22)	6(21)	0	1(9)	5(15)	3(27)	22(17)
Instructor	7(22)	6(21)	0	1(9)	1(3)	1(9)	16(13)
Print	0	1(3)	0	0	1(3)	0	2(2)
Screen	0	1(3)	0	0	1(3)	0	2(2)
Student	1(3)	0	0	0	0	0	1(2)
Number of times a preference was indicated							75

A preference for another method was indicated by a student 75 times. The majority of these methods are people-centred methods: 25% of the students expressed a preference for a workshop, 17% preferred to learn from library staff, and 13% preferred to learn from an instructor.

Non-users of the Online Catalogue

Only three students had not used the online catalogue. Information on these students is displayed in Table 11.

Table 11

Non-users of the Online Catalogue

Non-Users	Potential Use		
	No plans	With plans	Total
	# (%)	# (%)	# (%)
By Department			
ADM	1 (3)	1 (3)	2 (7)
FDN	0	1 (8)	1 (8)
By Program			
MEd-Project	1 (3)	2 (5)	3 (8)
Total	1 (1)	2 (2)	3 (2)

Of the three students who had not used the online catalogue, all were registered in the project route, and two of them were in the Department of Educational Administration. Two of the three students indicated that they planned to learn to search the online catalogue.

The three reasons cited by the non-users of the online catalogue are given in Table 12.

Table 12

Reasons for not Using the Online Catalogue

Reasons	#	%
I had no time to learn	2	67
I did not know about it	2	67
I was anxious about asking for help	1	33

Since the online catalogue at the University of Alberta has no print equivalent, except for a card catalogue which lists only pre-1974 material, it is not surprising that the numbers of students who have not used it are so low. It is surprising that two students said that they did not know about the online catalogue, considering that graduate students receive a general library orientation in the research course before the BRS-AD workshop. It is possible that some students missed the general orientation.

Open-ended Findings Relating to the Online Catalogue

Students included some comments, in addition to their responses to the questionnaire. Three students who learned to use the online catalogue on their own, expressed concern that they were not using the system to its full advantage - especially with regard to the expanded search feature. One student commented that the system didn't always work, while another expressed the need to search the catalogue via modem. One student said he/she was very pleased with the print and on-screen instructions. Another commented on how easy the system was to learn, while a third said that library staff were quick to respond when help was needed.

Findings Relating to Sub-problem Three

Findings relating to sub-problem three include: the rate of use of PsycLIT on CD-ROM, methods used to learn to use PsycLIT, and non-users of PsycLIT.

Rate of Use of PsycLIT

The use of PsycLIT by students in various departments and programs is presented in Table 13.

Table 13

Use of PsycLIT

Users	Rate of Use			
	Once/ twice	Occasional	Regular	Total
	# (%)	# (%)	# (%)	# (%)
By Department				
ACT	8(25)	1(3)	1(3)	10(31)
ADM	2(6)	1(3)	0	3(10)
ELE	2(20)	1(10)	0	3(30)
FDN	0	0	0	0
PSY	6(18)	10(29)	13(38)	29(85)
SEC	1(9)	1(9)	0	2(18)
By Program				
MEd-Project	3(8)	1(3)	0	4(10)
Med-Thesis	14(20)	8(12)	10(14)	32(46)
PhD	2(9)	5(23)	4(18)	11(50)
Total Users	19(15)	14(11)	14(11)	47(36)

At the time of the study, 36% of the students had used PsycLIT. The use rates of PsycLit by graduate students varied by the Department in which the students were registered. The Department of Educational Psychology had the highest use rate at 85%, followed by Adult, Career and Technology Education at 31%, Elementary Education at 30%, Secondary Education at 18%, Educational Administration at 10%, and Educational Foundations at 0%.

The high use rate of PsycLIT by students in the Department of Educational Psychology is not surprising given the name and subject coverage of the database. However, it should be noted that PsycINFO (the online version of PsycLIT) is available on BRS-AD, that all the students received instruction on BRS-AD, but that only 47% of the Educational Psychology students searched BRS-AD after the workshop. Students in Educational Psychology receive no compulsory instruction on PsycLIT, yet 85% have used it at least once, and 38% describe themselves as being regular users.

The use rates of PsycLIT by graduate students varied by the Program in which the students were registered. Of the students in the PhD program, 50% had searched PsycLIT, 46% of the students in the thesis route of the Master's program had searched PsycLIT, and 10% of the students in the project route of the Master's program had searched PsycLIT.

Methods of Learning to Use PsycLIT

Users of PsycLIT were asked to indicate any of 6 methods they used to learn to search PsycLIT, including: following instructions on the computer screen, learning from a library staff member, learning from another student, following print instructions, attending a workshop, or learning from an instructor. The 47 users of PsycLIT were asked to rate the methods they used as being satisfactory or unsatisfactory. Satisfactory learning methods are presented in Table 14 and unsatisfactory methods are presented in Table 15.

Table 14

Satisfactory Methods of Learning PsycLIT

	Group						
	ACT	ADM	ELE	FDN	PSY	SEC	TOTAL
Methods	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)
Staff	9(90)	2(66)	3(100)	0	28(97)	2(100)	44(94)
Screen	5(50)	1(33)	1(33)	0	17(59)	0	24(51)
Print	5(50)	0	2(66)	0	11(38)	0	18(38)
Workshop	1(10)	0	0	0	6(21)	0	7(15)
Student	1(10)	0	0	0	2(7)	0	3(6)
Instructor	0	0	0	0	1(3)	0	1(2)
Number of times a method was rated satisfactory							97

Note. Users=47

Of the methods used by students, 92% were rated as satisfactory. Of the satisfactory methods, learning from a library staff member was used most often (94%), followed by following instructions on the computer screen (51%), followed by learning from printed instructions (38%). It should be noted that all of these are informal methods.

Table 15

Unsatisfactory Methods of Learning PsycLIT

	Group						
	ACT	ADM	ELE	FDN	PSY	SEC	TOTAL
Methods	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)
Print	1(10)	0	0	0	3(10)	0	4(9)
Staff	1(10)	0	0	0	1(3)	0	2(4)
Screen	0	0	0	0	2(7)	0	2(4)
Workshop	0	1(33)	0	0	0	0	1(2)
Number of times a method was rated unsatisfactory							9

Note. Users=47

Eight percent of the methods used to learn to use PsycLIT were rated as being unsatisfactory: 9% of the students rated learning from printed instructions as being unsatisfactory, 4% rated learning from a library staff member as being unsatisfactory, and 4% rated learning from the computer screen as being unsatisfactory.

Preferred methods of learning PsycLIT. Students were asked to indicate any learning method or methods they would have preferred to have used to learn to use PsycLIT. These are presented in Table 16.

Table 16

Preferred Methods of Learning PsycLIT Other Than or in Addition to Method(s) Used

	Group						
Method	ACT	ADM	ELE	FDN	PSY	SEC	TOTAL
Workshop	4(40)	1(33)	0	0	3(10)	0	8(17)
Instructor	3(30)	1(33)	0	0	1 (3)	0	5(11)
Screen	1(10)	0	0	0	3(10)	0	4 (9)
Print	0	1(33)	0	0	1 (3)	0	2 (4)
Staff	0	1(33)	0	0	0	0	1 (2)
Number of times a preference was indicated							20

Note. Users=47

A preference for another learning method was indicated 20 times. The methods chosen most often are the people-centered methods: learning from a workshop was the preferred method for 17% of the students, and learning from an instructor was the preferred method for 11% of the students.

Non-users of PsycLIT

Information on the 83 students who had not used PsycLIT is displayed in Table 17.

Table 17

Non-Users of PsycLIT

Non-users	Potential Use		
	No plans	With plans	Total
	# (%)	# (%)	# (%)
By Department			
ACT	9(28)	13(41)	22(69)
ADM	24(77)	4(13)	28(90)
ELE	2(20)	5(50)	7(70)
FDN	9(75)	3(25)	12(100)
PSY	1(3)	4(12)	5(15)
SEC	4(36)	5(45)	9(82)
By Program			
MEd-Project	28(72)	7(18)	35(90)
MEd-Thesis	15(22)	22(32)	37(54)
PhD	6(27)	5(23)	11(50)
Total non-users	49(38)	34(26)	83(64)

While the majority of graduate students (64%) had not used PsycLIT at the time of the study, there were a number of students who indicated that they planned to search it: 50% of the Elementary Education students, 45% of the Secondary Education students, and 41% of the Adult, Career and Technology students. Only 1 Educational Psychology student either had not searched PscyLIT or had no plans to search it.

The non-users were asked to select from a list of reasons for not using PsycLIT, and were invited to list other reasons. These are displayed in Table 18.

Table 18

Reasons for not Using PsycLIT

Reasons	#	%
I did not know about it	48	58
I had no time to learn	29	35
I use other information sources	26	31
I am anxious about asking for help	7	8
I am anxious about computers	6	7
I had difficulty scheduling appointment	3	4
Instruction was not adequate for me	1	1
I have another reason:		
I don't need PsycLIT	21	25
I have no current need for PsycLIT	4	5

The reason given most often for not using PsycLIT, by 58% of the students, was not knowing about it. Thirty-five percent of the students indicated that they had no time to learn, and 31% indicated that they used other information sources. The print version of The Psychological Abstracts is available in the Education Library, and students may find it easier to continue to use the traditional abstracting service, rather than learn to use the computer-based version. It should be noted that 25% of the students indicated that they had no need for PsycLIT.

Open-ended Findings Relating to PsycLIT

A number of students contributed comments relating to their use of PsycLIT, in addition to the responses requested on the questionnaire. One student commented that the print instructions did not cover all the available options. Another said that the printed instructions needed to be re-written. A third student said that instructions from staff were too brief, while a fourth student mentioned that some library staff were unable to help. A fifth student described the library staff as "terrific, patient, and helpful".

In addition to these comments relating to the quality of the instruction, there were a number of miscellaneous comments. One student indicated that he/she had used PsycLIT, but a library staff member had done the searching. Another expressed a need to search PsycLIT via modem. One student commented that he/she had not known about PsycLIT, but planned to go to the library to learn from a library staff member. The need to use the system several times before becoming proficient was pointed out by another student.

Findings Relating to Sub-problem Four

Findings relating to sub-problem four include: the rate of use of ERIC on SPIRES, methods used to learn to use ERIC on SPIRES, and non-users of ERIC on SPIRES.

Rate of Use of ERIC on SPIRES

Findings relating to the rate of use of ERIC on SPIRES are presented in Table 19.

Table 19

Use of ERIC on SPIRES

Users	Rate of Use			
	Once/ twice	Occas- ional	Regular	Total
	# (%)	# (%)	# (%)	# (%)
By Department				
ACT	14(44)	12(38)	3(9)	29(91)
ADM	8(26)	13(42)	9(29)	30(97)
ELE	5(50)	0	2(20)	7(70)
FDN	2(17)	6(50)	0	8(67)
PSY	12(35)	5(15)	3(9)	20(59)
SEC	3(27)	4(36)	2(18)	9(82)
By Program				
MEd-Project	12(31)	16(41)	5(13)	33(85)
MEd-Thesis	29(42)	17(25)	7(10)	53(77)
PhD	3(14)	7(32)	7(32)	17(77)
Total users	44(34)	40(31)	19(15)	103(79)

A total of 103 graduate students had used ERIC on SPIRES at the time of the study for a mean use rate of 79%. Use varied by Department from a high of 97% for Educational Administration and 91% for Adult, Career and

Technology Education, to 59% for Educational Psychology. It should be noted that both the Departments with the highest use rates offer instruction on using ERIC as part of some of their courses.

Use varied somewhat by program, with students in the Project route of the Master's program using ERIC on SPIRES at a slightly higher rate than students in the thesis route of the Master's program or students in the PhD program. The relatively large number of Educational Administration students in the project route may account for the higher use rate by students in the project route.

Methods of Learning to Use ERIC on SPIRES

Students who had used ERIC on SPIRES were asked to indicate which of six methods they used to learn to search it, including: following instructions on the computer screen, learning from a library staff member, learning from another student, following printed instructions, attending a workshop, or learning from an instructor. The 103 students who had used ERIC on SPIRES were asked to indicate which methods were satisfactory and which were unsatisfactory. Satisfactory methods are displayed in Table 20 and unsatisfactory methods are displayed in Table 21.

Table 20

Satisfactory Methods of Learning ERIC on SPIRES

	Group						
	ACT	ADM	ELE	FDN	PSY	SEC	TOTAL
Methods	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)
Staff	23(79)	14(47)	4(57)	7(88)	14(70)	6(67)	68(66)
Instructor	8(28)	20(67)	1(14)	1(13)	4(20)	2(23)	36(35)
Workshop	13(45)	6(20)	4(57)	2(25)	5(25)	4(44)	34(33)
Print	12(41)	6(20)	2(29)	3(38)	2(10)	0	25(24)
Screen	9(31)	9(30)	2(29)	2(25)	2(10)	0	24(23)
Student	6(21)	11(37)	0	0	0	1(11)	18(17)

Number of times a method was rated satisfactory 205

Note. Users=103

Ninety percent of the methods used by students to learn to use ERIC on SPIRES were rated as being satisfactory. Of the satisfactory methods, learning from library staff was the method used most often (by 66% of the users), followed by learning from an instructor (by 35% of the users), followed by attending a workshop (by 33% of the users). Because of the importance of the ERIC database to students studying in the field of Education, there are more opportunities for students to receive formal instruction.

Table 21

Unsatisfactory Methods of Learning ERIC on SPIRES

	Group						
	ACT	ADM	ELE	FDN	PSY	SEC	TOTAL
Methods	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)
Print	4(14)	1(3)	0	1(5)	1(5)	0	7(7)
Screen	1 (3)	2(7)	0	0	1(5)	1(11)	5(5)
Instructor	1 (3)	2(7)	0	0	1(5)	1(11)	5(5)
Student	0	3(10)	0	0	0	0	3(3)
Staff	1 (3)	1(3)	0	0	0	0	2(2)
Number of times a method was rated unsatisfactory							22

Note. Users=103

Ten percent of the methods used by students to learn to use ERIC on SPIRES were rated as unsatisfactory, including: learning from printed instructions by 7% of the users, and learning from the computer screen and learning from an instructor, both by 5% of the users.

Preferred Methods. Students were asked to indicate any methods that they would have preferred to have used to learn to search ERIC on SPIRES. Students' preferences are presented in Table 22.

Table 22

Preferred Methods of Learning ERIC on SPIRES

Learning	Group						
Method	ACT	ADM	ELE	FDN	PSY	SEC	TOTAL
	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)	#(%)
Workshop	5(17)	5(17)	1(14)	1(13)	4(20)	1(11)	17(17)
Screen	5(17)	2(7)	1(14)	0	2(10)	1(11)	11(11)
Print	1(3)	2(7)	0	0	3(15)	2(23)	8(8)
Staff	1(3)	4(13)	0	0	0	1(11)	6(6)
Student	1(3)	0	0	0	2(10)	0	3(3)
Instructor	0	1(3)	0	0	0	1(11)	2(2)
Number of times a preference was indicated							47

A preference for another learning method was indicated by students 47 times. Attending a workshop was chosen by 17% of the students, while learning from the computer screen was chosen by 11% of the students. It should be noted that ERIC on SPIRES is a command-driven system with little on-screen instruction, which probably explains the percentage of students who would have preferred to have learned from the screen.

Non-users of ERIC on SPIRES

Information on the students who had not used ERIC on SPIRES is displayed in Table 23.

Table 23

Non-users of ERIC on SPIRES

Non-users	Potential Use No plans # (%)	 With plans # (%)	 Total # (%)
By Department			
ACT	1(3)	2(6)	3(9)
ADM	1(3)	0	1(10)
ELE	1(10)	2(20)	3(30)
FDN	0	4(33)	4(33)
PSY	5(15)	9(26)	14(41)
SEC	0	2(18)	2(18)
By Program			
MEd-Project	1(3)	5(13)	6(16)
MEd-Thesis	6(9)	10(14)	16(23)
PhD	1(5)	4(18)	5(23)
Total non-users			27

It is not surprising that the greatest percentage of non-users of ERIC on SPIRES are Educational Psychology students, given their high use rate of PsycLIT. However, only 15% of the Educational Psychology students indicated that they had no plans to search ERIC on SPIRES. Only 3 other students from all the other departments indicated that they had no plans to search ERIC on SPIRES.

The non-users were asked to select from a list of reasons for not using ERIC on SPIRES, and they were given the opportunity to list other reasons. These are displayed in Table 24.

Table 24

Reasons for not Using ERIC on SPIRES

Reasons	#	%
I had no time to learn	14	52
I use other information sources	12	44
I did not know about it	10	37
Instruction was not adequate for me	3	11
I am anxious about asking for help	3	11
I am anxious about computers	3	11
I have another reason:		
I don't need ERIC	3	11
I have no current need for ERIC	2	7

Fifty-two percent of the non-users indicated that they had no time to learn, and 44% indicated that they used other information sources. The print version of ERIC is available in the Education Library, and students may find it easier to continue to use the traditional abstracting service, rather than learn to use the computer-based version. Thirty-seven percent of the non-users did not know about ERIC on SPIRES. It should be noted that 11% of the non-users indicated that they had no need for ERIC.

Open-ended Findings Relating to ERIC on SPIRES

A number of students commented on their experience with learning to use ERIC on SPIRES. One indicated that there had been a considerable amount of transfer of learning from the BRS-AD workshop. Another pointed out that there was a need for review after the ERIC workshop. Another student said that after the workshop, everything seemed to go wrong, however, the help of library staff was appreciated. One student pointed out that he/she searches ERIC on SPIRES using a modem.

Suggestions for improving the library's service were offered by two students. One said that the print instructions could be improved by using less writing and more pictures to make them easier to follow. Another suggested that improved signage would direct people to the appropriate system.

Findings Relating to Sub-problem Five

Graduate students were asked when they wanted to learn to use several computer-based information systems. The results are presented in Table 25.

Table 25

Schedule for Learning Computer-based Information Systems

System	At the start of my program	During a research course	Whenever I felt the need
	# (%)	# (%)	# (%)
Online catalogue	110(85)	8(6)	31(24)
ERIC on SPIRES	83(64)	38(29)	33(25)
BRS-AD	71(55)	46(35)	34(26)
PsycLIT	65(50)	24(18)	41(32)

Note. The number of times chosen exceeds the total number of students because many students chose more than one time for instruction.

The beginning of their program was the point at which the majority of graduate student said that they wanted to learn to use computer-based information systems. Eighty-five percent of the students thought that the beginning of their program was the best time to learn to use the online catalogue and 64% indicated that the beginning of their program was the best time to learn to use ERIC on SPIRES. While 50% of the students indicated that the beginning of their program was the best time to learn to use PsycLIT, it should be noted that 91% of the Educational Psychology students indicated that the beginning of the program was the best time to learn to use PsycLIT.

Findings Relating to Sub-problem Six

Students were asked to indicate any of six actions the library could take to increase their use of computer-based information systems. The actions the library could take, according to the students' opinions, are listed in Table 26, the suggestions offered by students are listed in Table 27, and the areas of specialization for which students requested access to computer-based information systems are presented in Table 28.

Table 26

Actions the Library Could Take to Increase the Use of Computer-based Information Systems

Actions	#	%
Provide more information about the systems	74	60
Provide one-on-one assistance	74	60
Provide more classroom instruction on searching the systems	65	50
Provide systems that are easier to use	53	41
Provide more help with using computers	41	32
Provide a database in my area of specialization*	23	18

*Areas of specialization for which databases were requested are listed in Table 28.

Two actions for increasing the use of computer-based information systems were chosen by 60% of the students: provide more information about the systems, and provide one-on-one assistance. Fifty percent chose provide more classroom instruction, 41% chose provide systems that are easier to use, and 32% chose provide more help with using computers.

Table 27

Suggestions from Students for Increasing the Use of Computer-based Information Systems

Suggestions	#	%
Provide more computers in the library	6	5
Provide more free time	4	3
Provide access via modem	4	3
Provide hands-on tutorials	3	2
Provide a concise student handbook to all graduate students upon registration	2	2
Post command sheets near the computers	2	2
Post a list of databases and their costs	1	1
Allow access to a free search on BRS anytime during the program, not just within one year	1	1
Provide workshops in the summer	1	1
Set up student signons for ERIC if students don't have one	1	1
Research courses should be taken earlier in the program	1	1
Teach ERIC before BRS, because it's free. Teach BRS using a database unavailable locally.	1	1
Provide a clipboard signup, like Health Sciences uses, so I don't have to ask to use it.	1	1
Practice to use it at an adequate level.	1	1

The suggestions offered by students elaborated on how the Library could increase the use of computer-based information systems. Students suggested that the Library could disseminate information to students by providing them with handbooks, command sheets, database lists and price lists. Students suggested the Library could improve curriculum and instruction by: providing hands-on tutorials, offering research courses earlier, teaching ERIC before BRS, providing practice, and providing summer workshops. Suggestions for improving access included: providing more computers, providing modems, setting up signons for ERIC, and developing an easier reservation system.

Table 28

Databases Suggested in Specific Fields:

Field	#
Educational Administration (one specified policy studies in Educational Administration)	5
Sociology of Education	4
Computer-assisted Instruction	3
Social Psychology	1
Counseling	1
Medline	1
Health	1
Nursing	1
Canadian Education	1
Training - Canadian Business Database	1
Business	1
Mathematics Education	1
Music Education	1
Interactive Video	1
Educational Change	1
Adult and Higher Education	1
Curriculum	1
Quebec research on language arts and reading	1

Of the areas of specialization in which students requested databases, only three areas were suggested by more than one student: educational administration, sociology of education, and computer-assisted instruction. However, 15 other areas of specialization were each mentioned by one student.

Open-ended Findings Relating to Increasing the Use of Computer-based Information Systems

Students included a number of comments about their use of computer-based information systems. Four students indicated that they were satisfied with their present levels of use. One student said, "I use them whenever I search a topic". Another said, "It's a great service: I love it". A third said, "Computer systems are a godsend. Thanks!"

Several students commented on the help they received from library staff. One student said, "staff on duty are not consistently knowledgeable, and this could be confusing". Others comments included: "I have received excellent help from library staff for ERIC"; "I'm pleased with the systems, their access and the help available"; "I'm very satisfied with staff encouragement and support"; "I found all the librarians extremely helpful and pleasant - a real joy to turn to whenever I need help".

Findings Relating to Sub-problem Seven

Findings relating to sub-problem seven include: rates of computer and library use, how previous computer use affects the rate of use of computer-based information systems, and how previous library use affects the rate of use of computer-based information systems.

Rates of Computer and Library Use

Students were asked about their levels of computer and library use at the time they entered their current program. The findings are displayed in Table 29.

Table 29

Previous Computer and Library Use

Use Level	Computers*	Libraries**
	# (%)	# (%)
Never	27(21)	4(3)
Infrequent (rare or occasional)	48(38)	44(34)
Regular (monthly or more often)	53(41)	81(63)

* Includes 2 non-responses

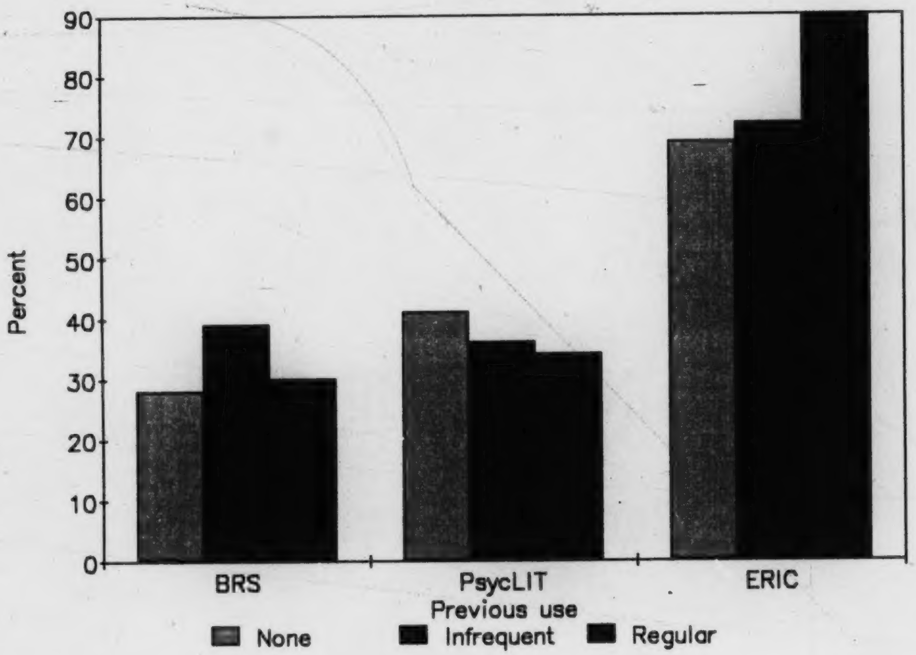
** Includes 1 non-response

The Effect of Previous Computer Use

The use of computer-based information systems by students with various levels of previous computer use is displayed in Figure 1.

Figure 1

Use of Computer-based Information Systems by Students with Varying Levels of Previous Computer Use



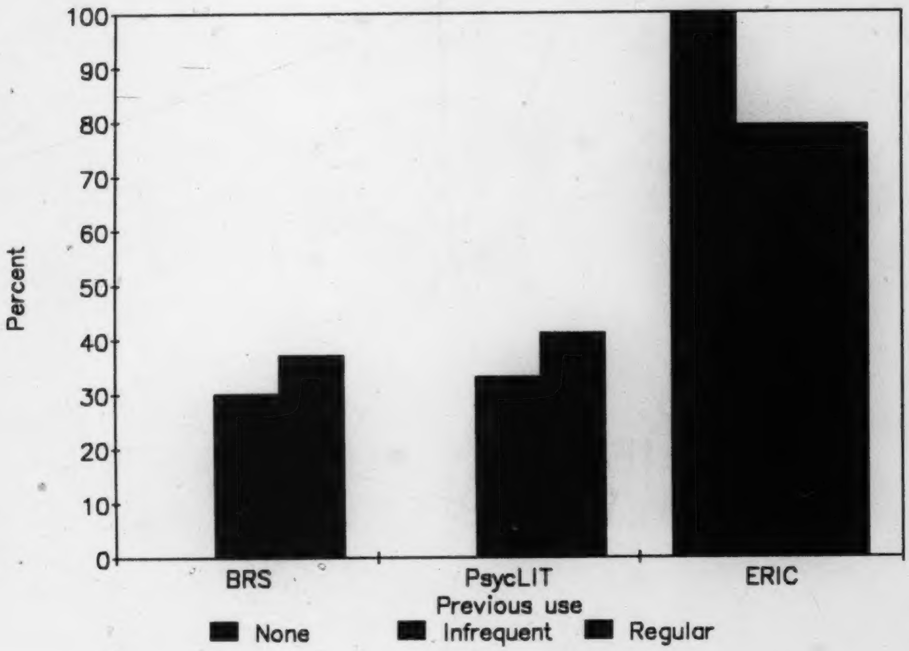
Students with no previous computer experience used BRS-AD and ERIC on SPIRES at a slightly lower rate than students who had some computer experience. However, students with no computer experience had used PsycLIT more than students who had some computer experience. It should be noted that of the three systems, PsycLIT is the easiest to use because it offers on-screen instructions, error messages that are easy to understand, flexibility in combining terms, and requires no signon procedures. In addition there is no charge to students for searching PsycLIT.

The Effect of Previous Library Use

The use of computer-based information systems by students with varying levels of previous library use is displayed in Figure 2.

Figure 2

Use of Computer-based Information Systems by Students with Varying Levels of Previous Library Use



The four students with no previous library experience had not used BRS-AD since the workshop nor had they used PsycLIT, but all four had used ERIC on SPIRES. It should be noted that of the three systems, ERIC on SPIRES is the only one available through remote access (unless students choose to subscribe on their own to a commerical database service).

Summary of Findings

The findings of this study are summarized under the following headings: use rates, the effect of previous computer and library experience on use rates, reasons for non-use, learning methods, the timing of instruction, and suggestions for increasing use.

Use Rates

Use rates of the computer-based information systems available in the Education Library varied according to the system being used, and the departments and programs in which the students were registered.

Variations according to the system being used.

Use rates varied from a high of 98% for the online catalogue, to 79% for ERIC on SPIRES, to 36% for PsycLIT, to 33% for BRS-AD since the workshop. Of the 4 systems, the online catalogue is the only one that does not have a print equivalent. ERIC, PsycLIT, and most of the databases available on BRS-AD have print equivalents available in the Library. The relatively high use of ERIC probably is due to the fact that the information available on the system is central to the studies of most Education students.

Potential use rates. If the number of students who indicated that they intended to use one of the computer-based information systems is added to the number who have used the systems, a potential use rate can be calculated. The potential use rate for the online catalogue is 99%; the potential use rate for ERIC on SPIRES is 94%; the potential use rate for BRS-AD is 86%; and the potential use rate for PsycLIT is 69%. These figures indicate that there is considerable potential for increasing students' use of three of the four systems (the exception being the online catalogue).

Regular use rates. In spite of the relatively high percentage of students who have used, or intend to use the computer-based information systems, the percentage of students who rate themselves as regular users is much lower: 84% rate themselves as regular online catalogue users; 15% rate themselves as regular ERIC users; 11% rate themselves as regular PsycLIT users, and 12% have used BRS-AD more than twice since the workshop.

These figures indicate that there is considerable potential for increasing the use rates of current users.

Variations in use according to the students' Departments. The use rates of computer-based information systems varied among the six departments within the Faculty. A mean use rate was calculated for each department, based on use of BRS-AD, the online catalogue, PsycLIT, and ERIC on SPIRES. The Department of Educational Psychology had the highest mean use rate at 73%. This was followed by three departments, whose use rates were very similar: Adult, Career and Technology Education had a mean use rate of 61%; Educational Administration and Secondary Education both had a mean use rate of 59%. The two departments with the lowest mean use rates were Elementary Education, with a mean use rate of 53% and Educational Foundations, with a mean use rate of 48%.

It should be noted that these means are skewed somewhat by including use rates for PsycLIT, because it had been used by 85% of the Educational Psychology students, and only by 0-30% of the students in the other departments. With the use rates for PsycLIT eliminated, the mean use rates are: 75% for Educational Administration, 71% for Adult, Career and Technology Education, 69% for Educational Psychology, 64% for Educational Foundations, and 60% for Elementary Education. Even with the elimination of the use rates for PsycLIT, the use rates for the Departments of Elementary Education and for Educational Foundations remain lower than those of the other departments.

Variations in use according to the students'programs. Use rates varied according to the programs in which the students were registered. A mean use rate was calculated for students in each program, based on the use rates for BRS-AD, the online catalogue, PsycLIT, and ERIC on SPIRES. PhD students had a mean use rate of 72%, followed by Master's students in the thesis route, with a mean use rate of 63%, followed by Master's students in the project route, with a mean use rate of 53%. These differing use rates probably reflect the differing needs for in-depth literature searches in the various programs.

Effect of Previous Computer and Library Experience on Use Rates. Lack of previous computer experience does not seem to be related to the non-use of computer-based information systems. However, students lacking previous library experience are less likely to use computer-based information systems than students with previous library experience, when the systems are available only in the library. It is interesting to note that the 4 students who reported having no library experience had all used ERIC on SPIRES. This could indicate that these students felt more comfortable using computers than libraries. Perhaps they received instruction on ERIC as part of a class, and relied on the one method they knew for accessing information.

Reasons for Non-use

The non-users in this study consisted of 3 non-users of the online catalogue, 27 non-users of ERIC on SPIRES, 83 non-users of PsycLIT, and 86 non-users of BRS-AD (since the compulsory workshop). Their reasons can be grouped under a number of general headings: lack of need, lack of information or forgetting, lack of time or cost, and other access problems.

Lack of Need. The most frequently cited reason (92 times) for not using computer-based information systems, was that other means of finding information were used. Presumably the students who gave this reason, were searching the print equivalents of the databases.

No need for a particular system was a reason given 55 times: 25 students had no need for PsycLIT; 20 students had no need for a major search on BRS-AD; 5 students already had enough literature to finish their theses, so did not need to search BRS-AD again; and 5 students had no need for ERIC (all from the Department of Educational Psychology).

Lack of information or forgetting. The second most frequently cited reason for not using computer-based information systems was not knowing about a particular system: 48 students did not know about PsycLIT; 10 did not know about ERIC, and 2 did not know about the online catalogue.

Thirty students had forgotten about BRS-AD. Of these, 24 had forgotten how to search it, and 6 had forgotten it was available.

Lack of time or cost. No time to learn was a reason given 53 times: 29 students had not had time to learn to use PsycLIT, 14 had not had time to learn ERIC, 7 did not have time to use BRS-AD, and 3 had not found time to learn the online catalogue.

Thirty-five students said that cost was a reason for not searching BRS-AD. Four of these students commented that they used local systems instead of BRS-AD because of the cost.

A number of students commented that because BRS-AD costs money to search, they were saving their free hour of searching for a major search. In some cases, however, the students forgot how to search, because of the time that had elapsed since the workshop. One student suggested that "refreshers" should be offered.

Other Access Problems. Anxiety about asking for help, was a reason given 25 times, while anxiety about computers was given 22 times. Difficulty scheduling an appointment was a reason given by 11 students. Eight had trouble scheduling BRS-AD searches, and three had trouble scheduling PsycLIT searches. Four students indicated that available instruction was inadequate for them. Three students had difficulty accessing a system; two of them were distant from the library.

How Users Learned

Students in the study did not have a choice in how they learned to search BRS-AD; all attended a workshop consisting of a lecture, followed by a hands-on lab. Students learning to use the other computer-based information systems tended to use a variety of methods. The methods used to learn to use the online catalogue, PsycLIT, and ERIC on SPIRES are displayed in Table 30.

Table 30

Learning Methods Used

Online Catalogue	PsycLIT	ERIC on SPIRES
Computer screen 101	Library staff 46	Library staff 70
Library staff 82	Computer screen 26	Instructor 41
Student 23	Print 22	Workshop 34
Print 19	Workshop 8	Print 32
Workshop 18	Student 3	Computer screen 29
Instructor 6	Instructor 1	Student 21
Total times 239	Total times 106	Total times 197
Total users 127	Total users 47	Total users 103

Note. The total times exceeds total users, because most students used more than one method.

It is interesting to note that relatively few students used the computer screen to learn to use ERIC on SPIRES, compared to the numbers who used the computer screen to learn to use the online catalogue and PsycLIT. This probably can be attributed to the fact that ERIC on SPIRES includes much less instruction on the computer screen than the other systems. A larger number of students learned to search ERIC on SPIRES from an instructor, compared to the other systems. Some instructors in the departments teach their students to search ERIC on SPIRES. Informal instruction from a library staff member or formal classroom or workshop instruction seems to be a prerequisite for using ERIC on SPIRES.

Of the learning methods, the most frequently used is the workshop (used 191 times, including 131 times for the compulsory BRS-AD workshop), followed in order of frequency by library staff (used 188 times), the computer screen (used 156 times), print (used 73 times), an instructor (used 48 times), and a student (used 47 times).

Satisfactory and unsatisfactory learning methods. Most students were satisfied with the learning methods that they used. Of the methods used by students to learn the online catalogue, PsycLIT, and ERIC on SPIRES, 89% were rated as satisfactory. The majority of the students who indicated that a particular learning method was unsatisfactory also indicated that they had found another satisfactory learning method. For instance, a number tried to follow instructions on a computer screen, and then turned to library staff for help. The unsatisfactory methods are displayed in Table 31.

Table 31

Unsatisfactory Methods for Learning the Online Catalogue, PsycLIT and ERIC on SPIRES

Learning Method	Number Unsatisfied	Total No. of Users	% Unsatisfied
Print	15	73	21
Computer screen	22	156	14
Student	6	47	13
Instructor	6	48	13
Workshop	4	60	6
Library staff	5	198	3

Preferred Learning Methods. A number of students indicated they had a preference for a learning method or methods they had not not used. The preferred methods are listed in Table 32.

Table 32

Preferred Methods for Learning Computer-based Information Systems

Learning Method	Times
Library staff	92
Workshop or instructor	75
Computer screen	55
Print	43
Student	4

Human-centered methods are preferred: learning informally from a library staff member or learning from a workshop or instructor. On the other hand, there are a considerable number of students who prefer to learn from the computer screen or from printed instructions.

Timing of Instruction

The majority of the students in the survey wanted instruction on computer-based information systems presented at the beginning of their program, but the percentage varied according to the systems: 84% of the students wanted to learn the online catalogue at the beginning, 63% of the students wanted to learn ERIC on SPIRES at the beginning, 54% of the students wanted to learn BRS-AD at the beginning, and 50% of the students wanted to learn PsycLIT at the beginning.

During the research course, only 6% wanted to learn the online catalogue, 29% wanted to learn ERIC on SPIRES, 35% wanted to learn BRS-AD, and 18% wanted to learn PsycLIT.

A number of students said they wanted to learn the systems whenever they felt the need, including 24% for the online catalogue, 25% for ERIC on SPIRES, 26% for BRS-AD, and 31% for PsycLIT.

It should be noted that the total percentages exceed 100%, because many students indicated that more than one time would be acceptable.

Suggestions for Increasing Use

Suggestions for increasing use have been grouped under the following headings: information, instruction and assistance, and access to the systems.

Information. Fifty percent of the students wanted more information provided on available systems. One student requested that a list of databases and costs be posted.

Instruction and assistance. The need for instruction and assistance was perceived by the students as being very important in increasing their use of computer-based information systems: 60% of the students said provide one-on-one assistance, 50% percent wanted more classroom instruction on searching the systems, and 32% of the students wanted more help with using computers. These percentages indicate that more support for new or inexperienced users could contribute to increased use of the available systems.

Access to the Systems. Acquiring systems that are easier to use, and providing additional databases would increase students' use of computer-based information systems. Forty-one percent of the students wanted systems that were easier to use, and 18% asked for databases in their areas of specialization. Of the 27 requests for information in specific fields, almost half were concentrated in 3 fields: educational administration, sociology of education, and computer-assisted instruction. The remaining 15 consisted of single requests for information in a particular field. Of the 15 requests, 3 dealt with Canadian content - one for training (a Canadian business database), one for Canadian education in general, and one for Quebec research. In general, the Canadian databases have been less accessible to students because of their relatively high costs and lack of menu-driven interfaces.

It is interesting to note that a number of the requests for access to particular databases could have been satisfied with CD-ROM products available at the University of Alberta. The four students who requested access to information on the sociology of education, along with the student who requested information on social psychology had access to Sociofile in the Humanities and Social Sciences Library. Similarily, the students who requested access to medical, health information, and nursing information had access to Medline and Nursing and Allied Health in the Health Sciences Library. The student who requested access to business information had access to ABI-INFO in the Business Library, and the student who requested access to a database on Canadian business had access to Canadian Business and Current Affairs in the Business Library. In addition to the locally available systems, there are databases on BRS-AD, which could have satisfied some of the requests for information in fields such as mathematics education or public policy.

Conclusions and Recommendations

The conclusions of this study, which relate to the use patterns of computer-based information systems by graduate students, are derived from the findings of the previous chapter. Based on these conclusions, a number of recommendations are made for increasing the use of the systems.

Conclusions

1. Use rates varied according to the system being used. The online catalogue had the highest use rate, followed in order of frequency by ERIC on SPIRES, PsycLIT, and BRS-AD. The online catalogue is used regularly by most of the students, which confirms findings in the literature that 77-84% of online catalogue users are regular users. With regard to the other three systems, which provide access to databases, there is considerable potential for increasing the numbers of students who use the systems and the use rate for current users.
2. Use rates varied according to the Departments in which the students were registered: Elementary Education and

Educational Foundations students used the systems less than students in the other Departments.

3. Use rates varied according to the programs in which the students were registered. Students in PhD programs had the highest use rates, followed by Master's students in the thesis route, followed by Master's students in the project route.

4. Lack of previous computer experience did not seem to be related to the non-use of computer-based information systems. This conclusion supports the finding of Matthews, Lawrence & Ferguson (1983) that: online catalogue users are not necessarily users of other computers.

5. Lack of previous library experience seemed to be related to the non-use of computer-based information systems, when the systems were available only in the library. This supports the finding reported in the literature that the characteristic most associated with online catalogue use is previous experience with using libraries (Lewis, 1987).

6. The major reasons for not using computer-based information systems were:

a. Students used other means of finding information - presumably the print equivalents of the databases. Other students learned to use a particular database (PsycLIT for the Educational Psychology students and ERIC for the other students), and did not feel they needed to search other systems.

b. Students lacked information regarding which databases were available.

c. Students lacked the time to learn.

d. With regard to BRS-AD, students cited two reasons for non-use: cost and forgetting how to search.

e. Some students were anxious about using computers and asking for help.

f. Difficulty scheduling an appointment was a reason given by some students.

These findings support the findings reported in the literature regarding some of the reasons for non-use: lack of need, lack of time, not knowing about it, using print alternatives, computer anxiety, and difficulty scheduling an appointment (Montgomery, 1987; Curtis, 1987; Matthews, Lawrence, & Ferguson, 1983, Pease & Gouke, 1982).

7. Students used six methods to learn to use the computer-based information systems, which are listed in order of frequency of use: attending a workshop, learning from library staff, learning from the computer screen, learning from print, learning from an instructor, and learning from another student.

8. Informal learning methods (learning from the computer screen or learning from library staff) were used most

often for those systems which include a considerable amount of instruction on the screen (ie. the online catalogue and PsycLIT). In the case of ERIC on SPIRES, which is a command-driven system, more formal instruction was used (workshops or learning from an instructor).

9. Most students were satisfied with the learning methods they used. This confirms the finding in the literature that most users tended to be satisfied with whatever method they used, with the exception of 11-15% of unsatisfied users (Matthews, Lawrence & Ferguson, 1983).

10. The methods rated satisfactory by the highest percentage of users were: learning from library staff and learning from a workshop. These two methods were preferred by students who expressed a preference for a method other than the method they used.

11. The methods rated unsatisfactory by the highest percentage of users were: learning from print and learning from the computer screen. The finding that printed instruction is the method rated lowest on students' lists of preferred methods is confirmed in the literature (Simon, 1986; Jaros, Anders & Hutchins, 1986; Pisciotta, Evans & Albright, 1984). In spite of the finding that most students prefer learning methods other than print, there was a group of independent learners who expressed a preference for print or the computer screen over the other methods they used.

12. The majority of students wanted instruction on computer-based information systems at the beginning of their programs.

13. In the opinion of the students, their use of computer-based information systems could be increased by doing the following:

a. provide one-on-one assistance, more classroom instruction, and more help with using computers.

b. provide more information on available systems.

c. acquire systems that are easier to use, and acquire systems to provide access to the literature in students' fields of speciality.

This study confirmed the finding reported in the literature that some of the factors that will increase searching are: a need, time, more training, and someone to help (Montgomery, 1987).

Recommendations

The findings of this study indicate that there is a discrepancy between the current use and the potential use of three of four of the computer-based systems (ERIC, BRS-AD, and PsycLIT). Students continue to use the print equivalents, even when access to computer-based databases is provided at no cost. This could be interpreted as an indication that the library needs to continue to maintain two subscriptions - one to the database (or the database vendor) and one to the print equivalent. On the other hand, the finding that almost all students do use the online catalogue when no print equivalent is available, indicates that students can adapt to computer-based information systems. In order to avoid the cost of maintaining duplicate subscriptions, it is recommended that the library develop a plan for replacing print databases with computer-based information systems. This plan has several components: acquiring new systems, marketing existing systems, changing the instructional program, and ensuring adequate access to the systems.

Acquiring New Systems

Because of the number of students who said that cost is a barrier to searching, it is recommended that the databases be purchased in CD-ROM format, where there is enough use to warrant purchase. In order to assess the potential use of new databases, it is important for the library to survey students on a regular basis. For less frequently used databases, it is recommended that the library's funding for searching online end user systems such as BRS-AD and Knowledge Index be restricted to databases which are not available locally on CD-ROM.

Based on the students' fields of specialization, it is recommended that the following databases be acquired in CD-ROM format:

1. CD:Education, which will be available in the Spring of 1991 includes: Canadian Education Index, which indexes Canadian educational periodicals, government reports, monographs and dissertations produced by the Canadian educational community, along with Onteris, which indexes research, reports, curriculum documents, and learning materials produced by the Ontario Ministry of Education. This CD-ROM product will help to satisfy the expressed needs of students for access to information on Canadian Education in general. It will be of particular interest for the Educational Administration students who are interested in Canadian educational policy, and for students interested in Canadian curriculum.

2. It is recommended that ERIC (Silverplatter version) be purchased to replace ERIC on SPIRES. A number of instructors in the Faculty of Education and staff in the Education Library have provided graduate students with classroom instruction, workshops, and one-on-one assistance to encourage them to use ERIC on SPIRES. In spite of these efforts, only 15% of the students described themselves as being regular users of ERIC on SPIRES. This is considerably lower than the 38% of Educational Psychology students, who describe themselves as being

regular users of PsycLIT. There are a number of reasons which could explain why ERIC on SPIRES has not been used as regularly as PsycLIT. ERIC on SPIRES is a command-driven system, which offers little on-screen instruction, and error messages in "computereze". It is quite inflexible to search, when compared to PsycLIT: users must specify the field(s) in which they wish to search; the abstract field cannot be searched; and different commands must be used to search for key words in the descriptor and identifier fields. In addition, students must have access to a signon id., and learn the procedure for signing on. Based on the differences in use between these two systems, it is recommended that ease-of-use, flexible search software, and similarity to existing systems be considered important criteria for the purchase of new computer-based information systems.

3. Because of the variety of specialized research interests expressed by Education students, it is recommended that the Education Library staff work more closely with other subject librarians on campus to ensure that access to specialized databases is available. For example: Microlog, which indexes documents issued by all three levels of government in Canada or PAIS (Public Affairs Information Service), which indexes the public policy literature would broaden access to government policy for Educational Administration students.

Microcomputer Index (which indexes the microcomputer literature) or INSPEC (a major database covering the fields of computers and information technology) or Computer Database (which indexes journals covering all aspects of computers, telecommunications, and electronics) would help to meet the specialized needs of the students interested in computer-assisted instruction or in interactive videodisc.

Marketing Existing Systems

The finding that a considerable number of students did not know about some of the computer-based information systems available on campus, indicates that the library needs to examine how it disseminates information to new students, and how it disseminates information about new products and services to students who have been in the program for some time. Five of the students who were specializing in the sociology of education or in social psychology did not seem to be aware that Sociofile, which covers the world's literature in sociology and related disciplines, was available in the Humanities and Social Sciences Library. The students who requested health-related information did not seem to be aware that the Health Sciences Library had two CD-ROM products at the time of the study: Medline, which covers the biomedical literature, and Nursing and Allied Health, which was designed to meet the needs of nursing and allied health personnel. The finding that 36% of the students did not know about PsycLIT, despite the fact that it had been available on campus for well over a year at the time of the study, provides another illustration of the need for information dissemination.

To inform incoming graduate students about the available databases, it is recommended that the library develop a guide to computer-based information systems accessible on campus, including a brief description of coverage, costs, how to learn to use the system, and how to book an appointment. This guide would be particularly important for education students, because of the interdisciplinary nature of many of the students' fields of specialization. Most Education students are interested in Education along with another discipline or subject area, such as mathematics education or music education. When the guide is produced, it should be distributed to all incoming graduate students. Because of rapid developments anticipated in this area, the guide will need frequent updating. It is recommended that information on new products and services be communicated to the students through flyers and through Departmental newsletters.

According to suggestions made by students in this study, signage in the library should be improved to promote the use of computer-based information systems. It is recommended that signage be reviewed to ensure that it accomplishes the following: directs students to what is available, and provides directions on how to learn to use the systems. It also is recommended that signs be posted near the print equivalents to promote use of the computer-based systems.

Because of the role that library staff play in instructing students to use computer-based information systems, and because many students prefer to learn from library staff, it is recommended that library staff take a proactive role in encouraging students to use computer-based information systems, by routinely demonstrating how the systems can be used to find answers to students' research problems. This is unlikely to happen if staff lack the knowledge and skills required to effectively use the systems themselves, and comments made by several students indicated that not all staff were equally knowledgeable. To enable staff to keep up with the ongoing introduction of new computer-based systems, it is recommended that the library implement a staff development program. The goals of the program would be: to ensure all staff are knowledgeable regarding the databases available on CD-ROM, the databases available on BRS-AD and Knowledge Index, along with databases available from other vendors; and to enable staff to develop the knowledge, attitudes and skills required to use all the features of new systems as they are introduced, so they can introduce the systems to students.

While this study has focussed on the use of computer-based information systems by graduate students, it must be remembered that many graduate students learn about information sources from Faculty members, especially from their advisors. It is recommended that the library keep Faculty informed regarding the accessibility of databases, using the same methods designed for informing graduate students through: flyers, Departmental newsletters, personal contact, and the distribution of a guide.

Changing the Instructional Program

Based on the findings of this study, it is recommended that the Education Library revise its instructional program for graduate students. Students expressed a strong preference for instruction to be offered at the beginning of their programs. For instance, among Educational Psychology students, 91% said that instruction on PsycLIT should be offered at the beginning of their programs. These findings need to be discussed with the Departments, so that appropriate programs can be set up. Depending on the interest and resources of the Department, the program could be as simple as a demonstration offered during the graduate orientation, or the instruction could be integrated into existing classes, and could include compulsory assignments.

Because students who lack previous library experience tend to use computer-based information systems at a lower rate than more experienced library users, the Education Library should attempt to offer more help to incoming students with little or no previous experience, including instruction on using computer-based information systems. More help should be offered to the Departments of Elementary Education and Educational Foundations, because of their relatively low levels of use.

It is recommended that a combination of learning methods continue to be offered, including the people-centered methods (workshops and one-on-one instruction), along with methods targeted toward more independent learners (on-screen and printed instructions). To provide more help for independent learners, it is recommended that a number of steps be taken: post command summaries near the computers, institute a system of clip-board sign-ups to encourage independent use of the systems, and improve the printed instructions by including more graphics and less writing.

The students' preferences for some sort of human instruction, whether from library staff, or from a workshop, could create a demand that the Education Library staff is unable to meet. The Library needs to introduce cost-effective ways of providing instruction to students. It is recommended that the number of compulsory classroom sessions be increased to reduce the need for individualized instruction by library staff. It is recommended that the Library implement a computer-assisted instruction project, the Online Access to Information (OLAI) Project, which is being jointly developed by the Library and the Faculty of Education, to provide instruction on using CD-ROM databases. The software used in the project, Authorware Professional, has been used to create tutorials and simulations for a number of computer-based information systems. Authorware Professional enables the instructor to anticipate incorrect responses that students might make, and to provide appropriate feedback. The finding that many students learned to use computer-based information systems, at least in part, from the computer screen indicates that there is considerable potential for delivering instruction via the screen. It is anticipated that the implementation of computer-assisted instruction could relieve some of the pressure for individualized instruction on demand.

It is recommended that the Education Library continue to offer the BRS-AD workshop as part of the research course, but coverage should be broadened to include Knowledge Index. Students could then be exposed to a broad range of secondary databases, after they have mastered the basics of searching on the CD-ROM products, such as ERIC, PsycLIT, Sociofile, Medline, etc. To promote searching of end user online systems after the research course, the systems must be marketed to the students, through the means of refreshers and reminders.

The Education Library's policy on accessing BRS-AD needs to be changed to encourage searching. By limiting searchers to a one hour session, some students "save up" for a major search, and by then they have forgotten about BRS-AD or have forgotten how to use it. A policy of allowing students to divide their one hour of free searching into shorter sessions would provide them with more opportunities to search. Dividing search sessions into shorter time periods has the added advantage of improving access to the equipment by other students, some of whom had problems scheduling an appointment.

Ensuring Adequate Access to the Systems

Before the decision is made to cancel print equivalents of CD-ROM products, adequate access to the systems must be ensured. As use of CD-ROM stations increases, there are two major options for increasing access: increase the number of database subscriptions and CD-ROM stations, and connect the CD-ROM stations to a local area network. It is recommended that the Library work toward the second option. The University's plan to link all campus buildings with a local area network, will provide the Library with the infrastructure required to make CD-ROM products available across campus. Networking will enable a number of students or faculty to use equipment located inside or outside the Education Library, to access a single CD-ROM station at the same time. The advantages for the Library are the reduced need for purchasing equipment, along with a saving on subscription fees. It is anticipated that as more and more graduate students enter the Faculty of Education as experienced computer users (41% were regular computer users at the time of the study), it is expected that the demand for remote-access will grow.

Limitations in the Methodology

In the questionnaire, there are a few variations between the questions on BRS-AD and those on the other systems, which make it difficult to make comparisons. It could have been modified so that the choices for students would be the same for each computer-based system under study.

Students in the Diploma program were not included in the study, because none were registered in any of the research courses. Diploma students could have been included, so that their use rates could have been compared to those of other graduate students, who received compulsory instruction as part of a research course.

Students' use of databases available outside the Education Library was not studied. Some comments by students indicated that a number were not aware of these resources. A question regarding the use of other computer-based information systems on campus could have provided useful data regarding use patterns throughout the Library.

Suggestions for Further Research

Assuming that the plan recommended in this study is implemented, a follow-up study should be conducted to evaluate the success of the plan. It is important to determine the rate at which computer-based information systems have been adopted, before a decision can be made regarding the cancellation of print subscriptions. This second survey would need to be expanded to include faculty and undergraduate students, and the survey instrument would need to be modified to reflect anticipated changes in the instructional program.

This study attempted to gather data that would provide a basis for setting a direction for the development of end user searching for graduate students. While the study focussed entirely on the Faculty of Education, there is some evidence in the literature that more Education students and faculty use CD-ROM products than students and faculty in other disciplines (Steffey & Meyer, 1989). The methodology and questionnaire developed for this study could be used to gather data on use patterns in other Faculties, which could serve as a basis for planning new services.

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Appendix 1

To: Graduate students in the Faculty of Education

From: Faye Maxwell, Librarian, H.T. Coutts Library &
M.Ed. Candidate, Faculty of Education

Re: Use of Computer-based Information Systems

Over the last several years, a number of computer-based information systems have been made available to graduate students in the Faculty of Education. I would like to ask for your help in gathering some data regarding your use of these systems.

The results of this study will be presented to Library Management, and will be used to help improve the information services that the Education Library offers to you and your fellow graduate students. In addition, the results of this study will form part of my M.Ed. thesis, a copy of which will be given to the Education Library.

The completed questionnaires in this study will be handled with strict confidentiality; only compiled results will be made available to Library management, or will be included in the thesis.

The questionnaires in this study have been numbered to permit follow-up with non-respondents. However, the link between students' names and the numbers on the questionnaires will be destroyed, when the questionnaires are returned.

I hope you can find ten to fifteen minutes in your busy schedule to complete the attached questionnaire. It is six pages in length, but it has been designed so that most questions can be answered with a few check marks.

If you have any concerns or questions with this study, please contact Faye Maxwell at 492-3770.

If you are able to complete this questionnaire, I would like to thank you in advance for your contribution to the library.

Please put your completed questionnaire into the enclosed self-addressed envelope, or drop it off at the Education Library Information Desk, if that is more convenient.

If possible, I would appreciate receiving your reply by February 16, 1990.

Questionnaire on Computer-based Information Systems

Background Information

Please provide information about the program in which you are registered by checking the appropriate box in the following chart:

Department	Program			
	Diploma	Masters Thesis route	Masters Project route	PhD
Adult Career & Technology				
Educational Administration				
Educational Foundations				
Educational Psychology				
Elementary Education				
Secondary Education				
Other - Please specify				

Please provide information about your levels of library use and computer use at the time you entered the program in which you are currently registered, by checking all appropriate boxes on the following chart:

Level of use when you began your current program	Computers	Libraries
Never used		
Rarely used		
Occasionally used		
Used monthly or more often		
Used weekly or more often		

BRS After Dark is a commercial database service, that you learned to search by attending a lecture and a lab offered by library staff. Please complete the following chart regarding your experiences with BRS After Dark:

How would you have preferred to have learned to search BRS After Dark?	Check all that apply
Attend the lecture and lab	
Learn from library staff member in the library	
Follow instructions on the computer screen	
Follow print instructions	
Use another method - Please specify	

Have you used BRS After Dark since the workshop?

☐ No but plan to
☐ No and don't plan to
☐ Once
☐ More than once

If you responded No or once, please complete this chart:

Reasons for not using BRS After Dark	Check all that apply
I forgot that it was available	
I forgot how to search BRS After Dark	
I use other means of getting information	
It takes too much time to use	
I am anxious about using computers	
I am anxious about asking someone for help	
I was dissatisfied with the first search	
I had difficulty scheduling an appointment	
I am concerned about cost	
I have another reason - Please specify	

The online catalogue lists the holdings of The University of Alberta Library System. Have you used the online catalogue?

☐ No but plan to
☐ No and don't plan to
☐ Once or twice
☐ Occasionally
☐ Regularly

If you have not used the online catalogue, would you complete chart a below; if you have used the online catalogue, please complete chart b below:

Chart a (for non-users)

Reasons for not using the online catalogue	Check all that apply
did not know about it	
I have other means of getting information	
I have not yet had time to learn to use it	
I am anxious about using computers	
I am anxious about asking someone for help	
I have another reason - Please specify	

Chart b (for users)

Methods for learning to use the online catalogue	Check any methods you used	Were you satisfied?		Check all methods you would have preferred
		yes	no	
Learn from a library staff member				
Learn from another student				
Learn from an instructor				
Follow instructions on the catalogue's screen				
Follow print instructions				
Attend a workshop				
Use another method - Please specify				

PsycLit on CD-ROM allows you to search the psychology literature on a compact disc. Have you used PsycLit?

☐ No but plan to
☐ No and don't plan to
☐ Once or twice
☐ Occasionally
☐ Regularly

If you have not used PsycLit, would you complete **chart a**; if you have used PsycLit, please complete **chart b**:

Chart a (for non-users)

Reasons for not using PsycLit	Check all that apply
I did not know about it	
I have other means of getting information	
I have not yet had time to learn how	
I am anxious about using computers	
I am anxious about asking someone for help	
Available instruction is inadequate for me	
I had difficulty scheduling an appointment	
I have another reason - Please specify	

Chart b (for users)

Methods for learning to use PsycLit	Check any methods you used	Were you satisfied?		Check all methods you would have preferred
		yes	no	
Learn from a library staff member				
Learn from a student				
Learn from an instructor				
Follow instructions on the computer's screen				
Use print instructions				
Attend a workshop				

Use another method - Please specify

ERIC on SPIRES allows you to search a part of the ERIC database, which is stored on the university's mainframe computer. Have you searched ERIC on SPIRES?

[ ] No but plan to
[ ] No and don't plan to

[ ] Once or twice
[ ] Occasionally
[ ] Regularly

If you have not used ERIC on SPIRES, complete chart a; if you have used ERIC on SPIRES, complete chart b.

Chart a (for non-users)

Reasons for not using ERIC on SPIRES	Check all that apply
I did not know about it	
I have other means of getting information	
I have not yet had time to learn how to use it	
I am anxious about using computers	
I am anxious about asking someone for help	
Available instruction is inadequate for me	
I had difficulty scheduling an appointment	
I have another reason - Please specify	

Methods for learning to use ERIC on SPIRES	Check all methods you used	Were you satisfied?		Check all methods you would have preferred
		yes	no	
Learn from a library staff member				
Learn from another student				
Learn from an instructor				
Follow instructions on the computer's screen				
Follow print instructions				
Attend a workshop				
Use another method - Please specify				

Please indicate when you would have liked to have learned to use computer-based information systems by checking all answers which apply on this chart:

System	At the start of my program	During a research course	Whenever I felt the need	Another time - Please specify
Online catalogue				
BRS After Dark				
PsycLit				
ERIC on SPIRES				

What would it take to increase your use of computer-based information systems? Please complete this chart:

Suggestions for increasing use of computer-based information systems	Check all thatapply
Provide more information about available systems	
Provide systems that are easier to use	
Provide more help with using computers	
Provide more classroom instruction on searching the systems	
Provide one-on-one assistance	
Provide a database in my area of specialization - Please specify your area	
Provide something else - Please specify	

Thank you very much for your time and effort in completing this questionnaire.

If possible, could you return the questionnaire by February 16, 1990.

Appendix 2

To: Graduate students in the Faculty of Education

From: Faye Maxwell, Librarian, H.T. Coutts Library &
M.Ed. Candidate, Faculty of Education

Re: Use of Computer-based Information Systems

Approximately one month ago, I sent you a questionnaire on your use of several computer-based information systems that are available to graduate students in the Faculty of Education. If you have submitted your response, please accept my thanks for your contribution to the library, and disregard the rest of this memo.

If you have not completed the questionnaire, I would like to urge you to do so. The results of this survey will be used to provide direction to the library in developing information services for you and your fellow graduate students. I would like to ensure that as many students as possible have an opportunity to have a say in the services that they receive. If you can find ten to fifteen minutes in your busy schedule to respond to the questionnaire, I certainly would appreciate hearing your opinions.

If you would like to complete the questionnaire, but have lost the copy I sent you, please call 492-3770, and ask for another copy. I'll make sure you get one.